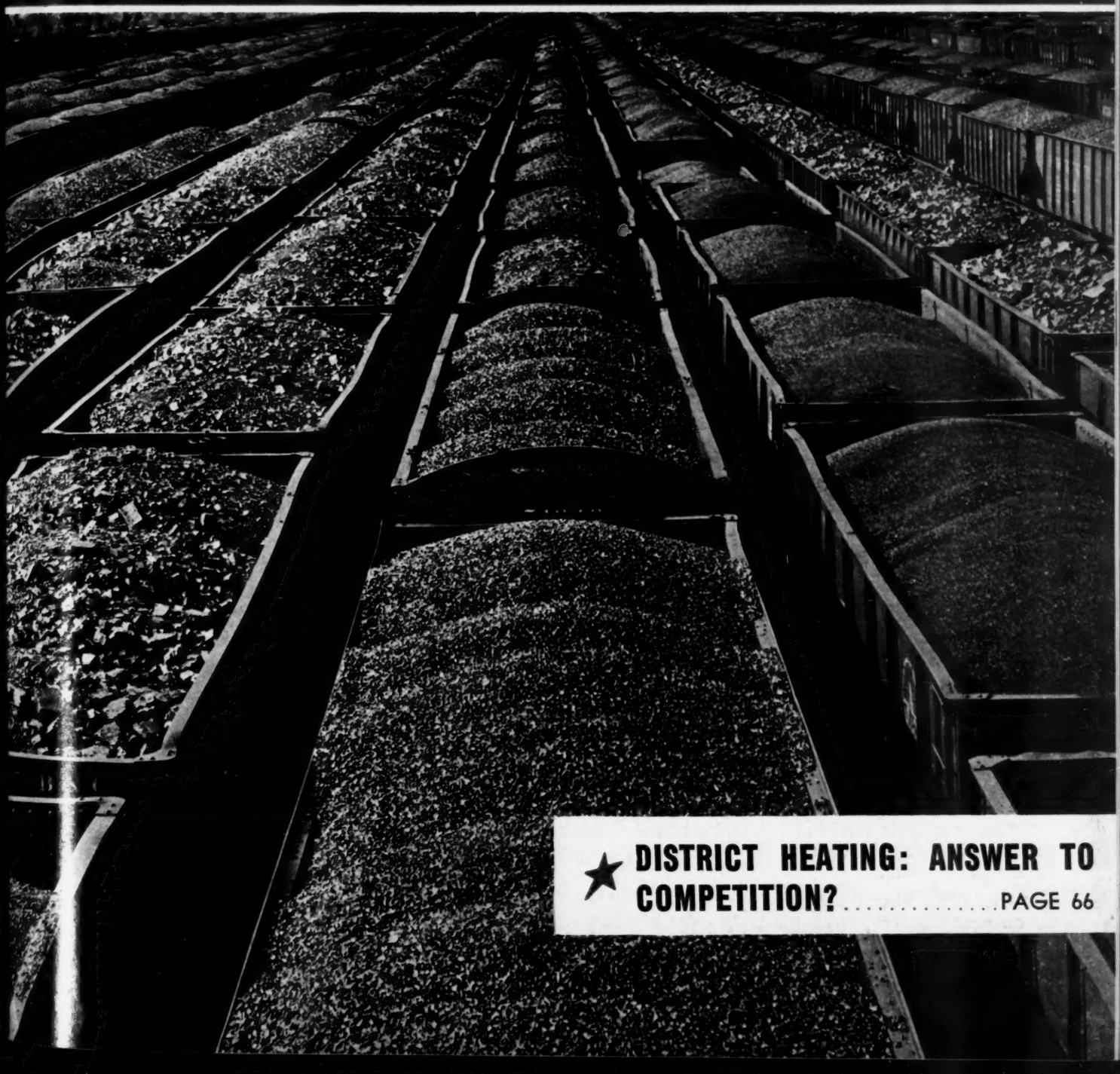
Coal Age

MARCH, 1946



★ **DISTRICT HEATING: ANSWER TO COMPETITION?** .....PAGE 66



Eliminates 86% OF SHUTDOWNS

SUN MINE LUBRICANT . . .

Lasts 7 Times Longer Than Former Grease, Increases Tonnage Loaded

A Pennsylvania mine had this experience on its loading-machines. Greases were separating. Two or three times a week, the transmission-cases and gathering-heads had to be completely cleaned and re-greased.

Tonnage loaded, per machine, went up, however, when they called in a Sun Engineer. He recommended a Sun grease, especially manufactured to withstand the particular conditions in that mine.

Loaders now operate weeks at a time, instead of shutting down every day or so. Higher production and lower maintenance-costs have been the inevitable result.

Mine after mine, where Sun's special mine-lubricants are used, knows the advantages of continuous production, and of holding maintenance-costs down to a minimum. You can put these lubricants, and the specialized experience of Sun men to work for you today. Call the Sun office near you. Or write . . .

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He's making it swallow its own tail

A typical example of B. F. Goodrich development in rubber

FOR years, belts were a terrible headache in paper mills — as well as a lot of other places. Metal fasteners, laces and other devices were used to join the two ends of the belt and make it endless. But the belts tore loose at the joints, slipped on the drive, failed to transmit power. Then the machinery had to be stopped while a new joint was made — sometimes as often as every 10 days.

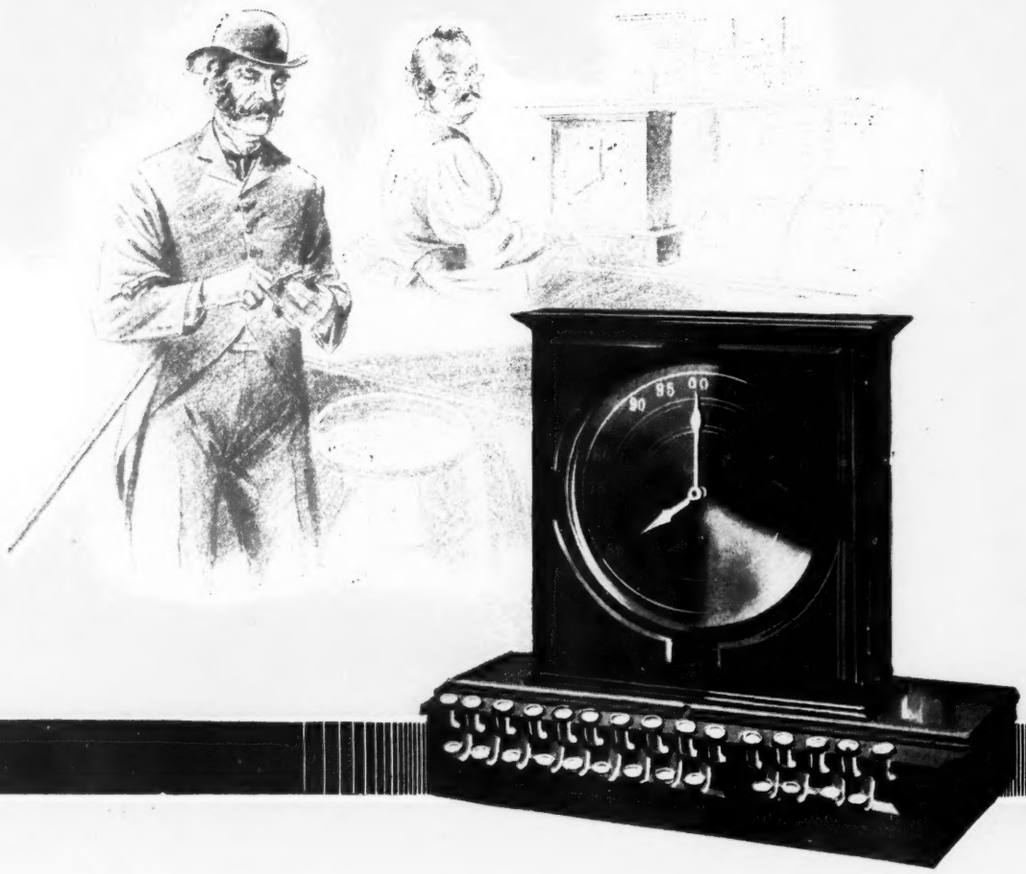
Then B. F. Goodrich engineers developed a way to make each end of the belt a part of the other end. It's called the Plylock Belt Joint because the plies of rubber and fabric are actually locked together by overlapping, then vulcanized to make the joint permanent. The result is a joint that is 3 times stronger than metal fasteners; that will outlast them by as much as 10 times. Shutdown time for the machinery is sharply cut, production materially increased.

This is a typical result of the research and development that is always under way at B. F. Goodrich — on new products and old, for every industry. From tiny grommets to huge oil hose, from vibration dampeners to coal conveyor belts, no product is ever considered "standard" at B. F. Goodrich. Your supplier will be glad to work with you on any problem involving the use of rubber products by B. F. Goodrich. *The B. F. Goodrich Company, Industrial Products Division, Akron, Ohio.*

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RUBBER *and* **SYNTHETIC** *products*

First in its Field....



THE FIRST CASH REGISTER...

It was invented in 1879 by James (Jake) Ritty of Dayton, Ohio. Mr. Ritty got the idea from observing the workings of a device on a steamship that recorded the revolution of the ship's propeller, thus giving a daily record relative to the speed of the steamship. He obtained Patent No. 247 in November 1879; and produced the first practical register in 1800. In 1884 the National Cash Register Company, with a staff of only 20 workmen, took over the business, that has since grown to such large proportions.

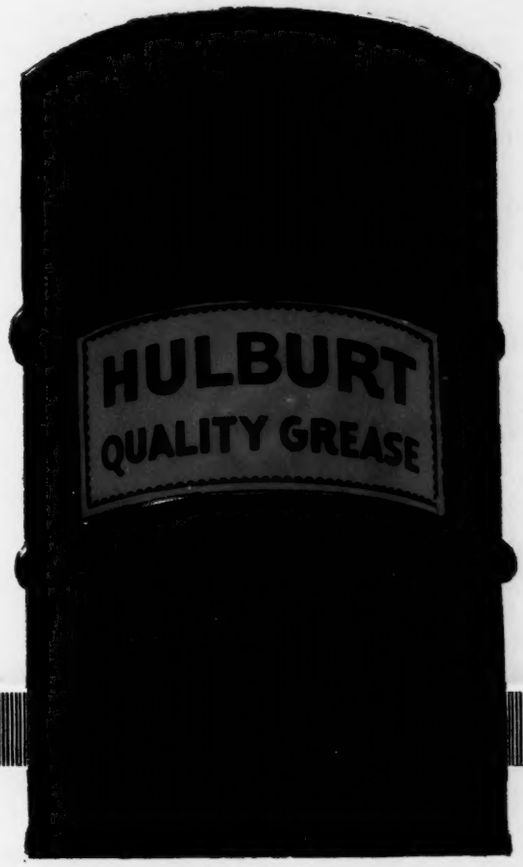
The performance of Mining Equipment will profitably influence your "cash register" when Hulburt coal mine lubrication "rings the bell". Hulburt down-in-the-mine Engineering Service, utilizing Hulburt Quality Grease, is the first thought of experienced coal men. FIRST, only a small number of coal mining men used it. Then as the quality of Hulburt Grease became more widely known, ever-increasing numbers of satisfied users have registered approval until it has become the Standard of Quality.

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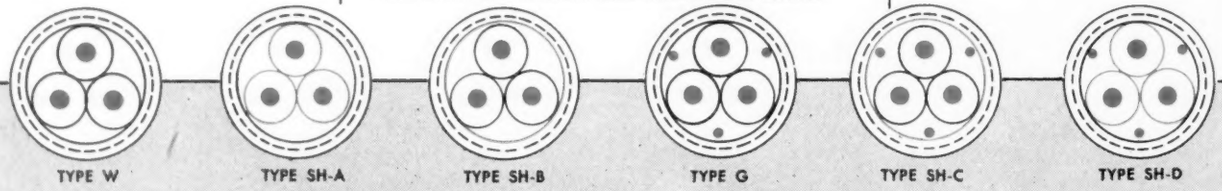
compare *Okocord* with other SHOVEL AND DREDGE CABLES



While a number of shovel and dredge cables conform to all IPCEA specification requirements, and some (including Okocord) exceed them in certain respects, this check list of cable life-extending features is offered to help you select cable on the basis of comparative value and service characteristics. It is a fair yardstick when used as follows: Read, feature by feature, the advantages listed in Column 1. Put, item by item, in the column headed "Cable 'x'" (Column 3) the corresponding features of any other cable you may be using or considering for use. Compare this data and decide for yourself which cable you are going to specify on your next purchase.
The Okonite Company, Passaic, New Jersey.



1. LIFE-EXTENDING FEATURE	2. OKOCORD	3. CABLE "X"
Greater Corrosion Resistance of Conductors	Okoloy lead alloy coating protects each individual strand. It outlasts tinning 2 to 1.	
Higher Breakdown Voltages	Semicon tape over higher voltage conductors increases dielectric strength.	
Greater Resistance to Heat and Ozone	Same Okolite moisture-resistant insulation as used in 35,000 volt cables. Operates up to 75°C	
Increased Flexibilty and Reduced Wire Breakage	Paper cushion under shielding aids flexing as do braid-enclosed ground wires.	
Firmer and More Rugged Assembly	Substantial rubber fillers increase mechanical protection, do not absorb moisture and are easier to handle when splicing.	
Mechanically Stronger Jacket	Tear-resisting seine twine cords reinforce the Okoprene sheath internally.	
Greater Resistance to Elements	Entire sheath is Okoprene, an Okonite-engineered neoprene compound that is non-flammable, oil and chemical resistant and will not sun-check.	



Fundamental Designs of Okocord Portable Power Cables (conductors, ground wires and shielding indicated in red.)

OKONITE insulated wires and cables 4373

Coal Age

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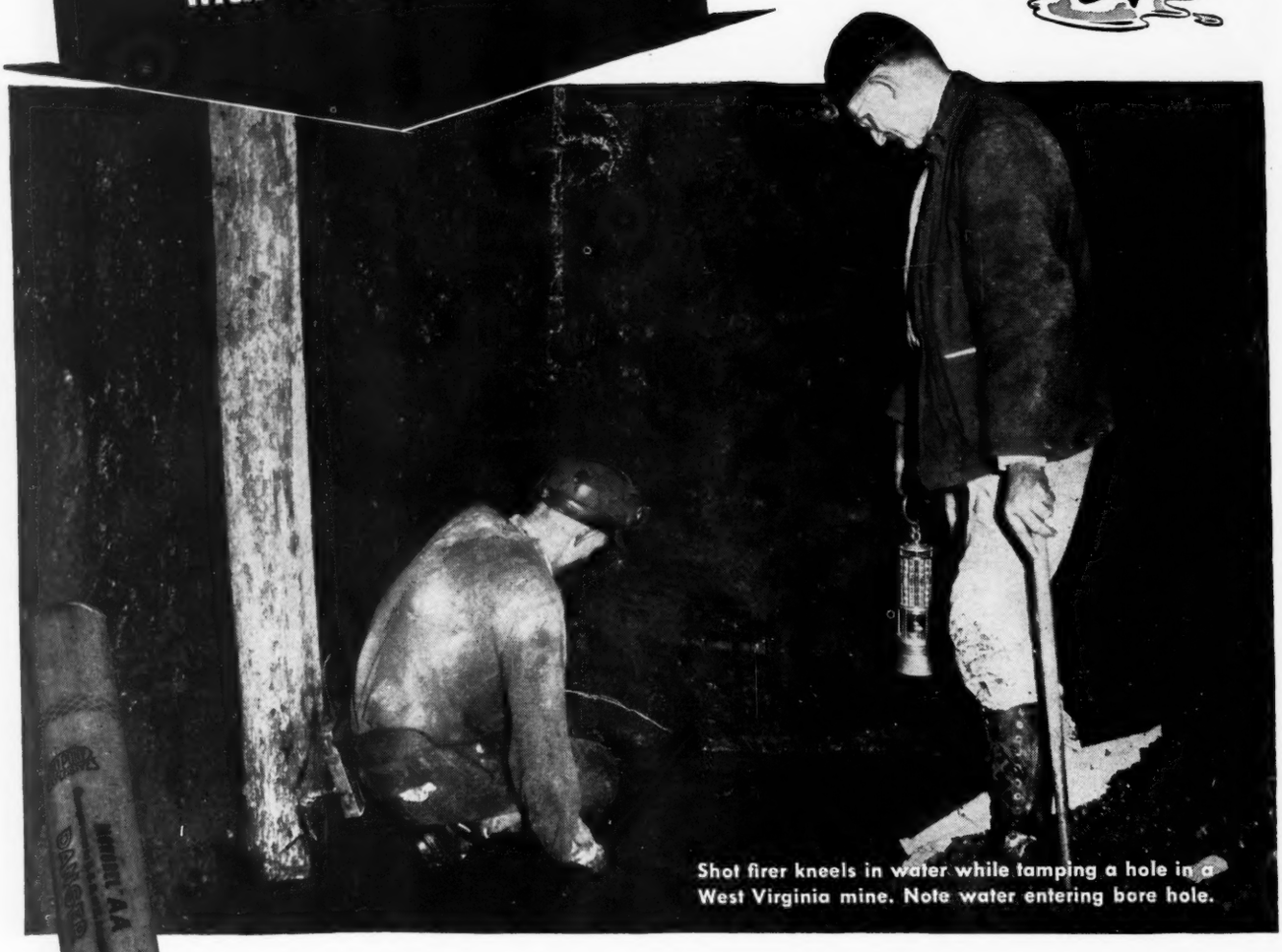
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...even where the work is WET



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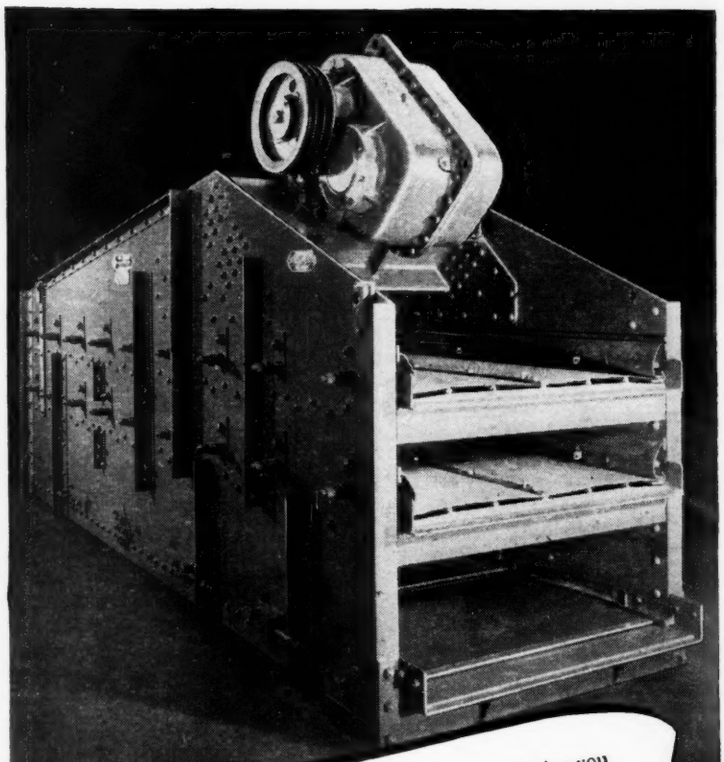
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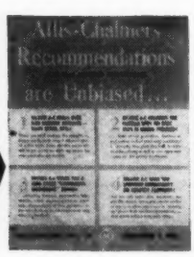
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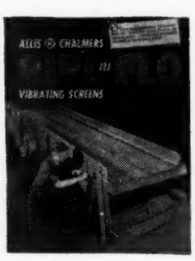
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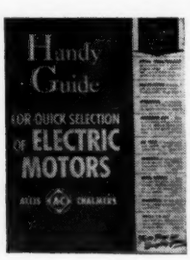
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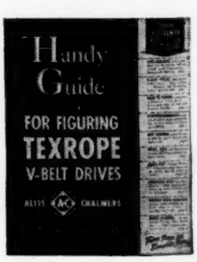
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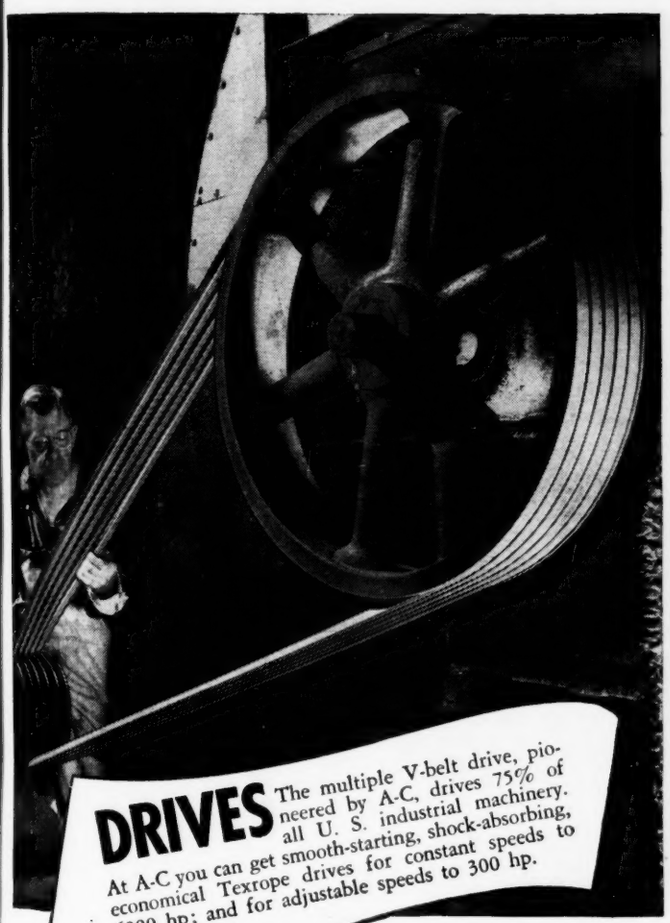


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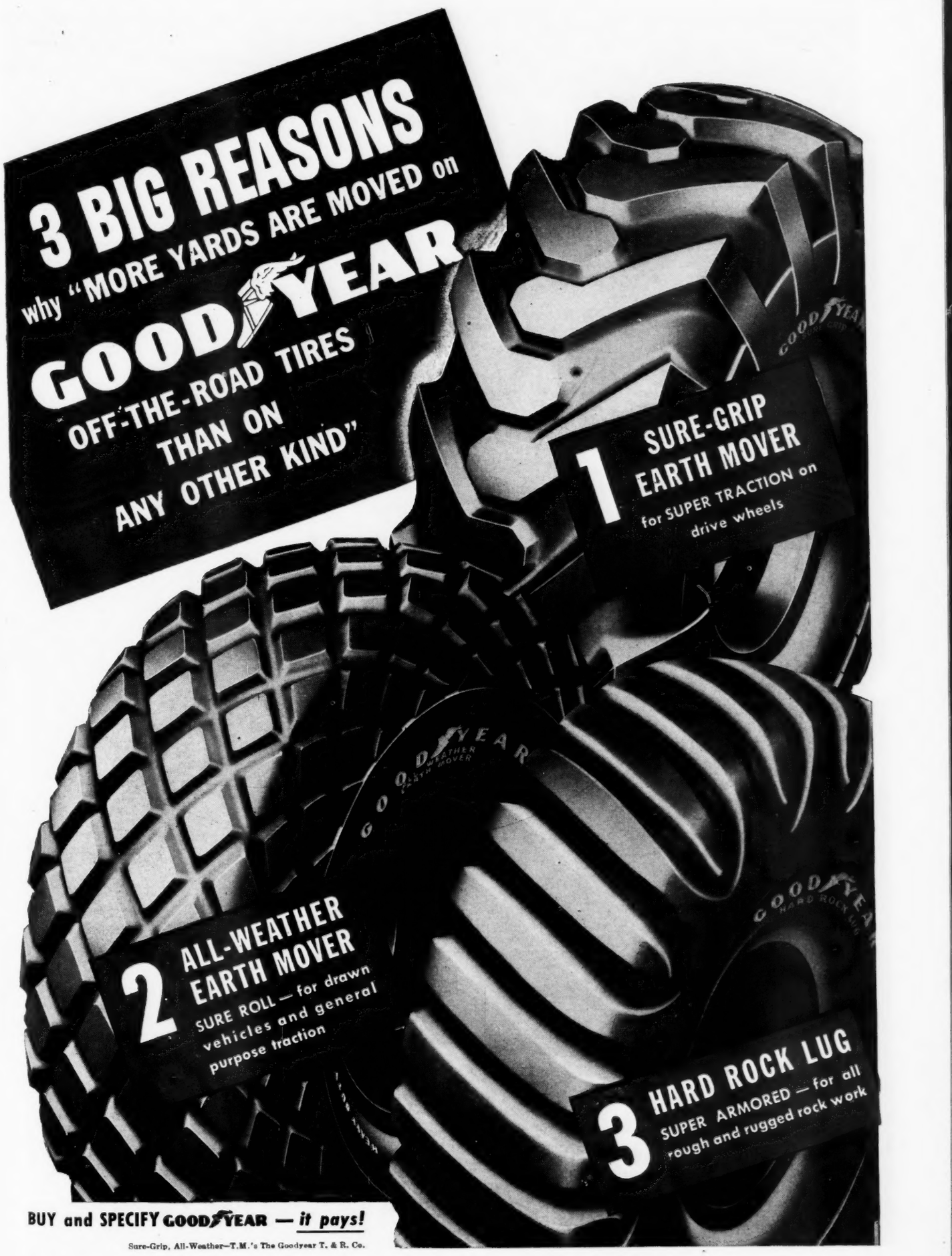
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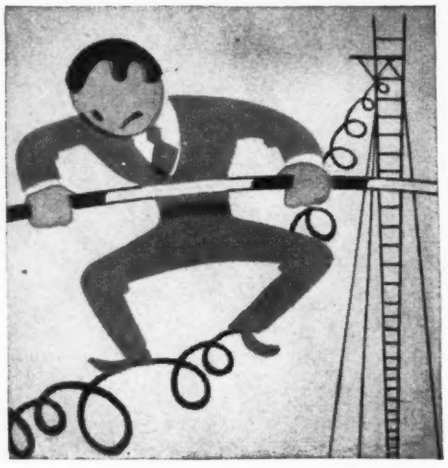
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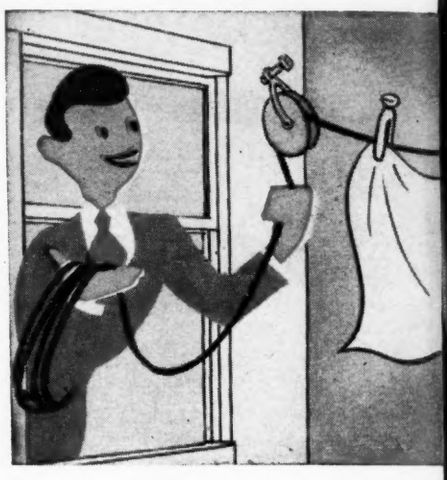
Resists Kinking

Being free from internal stress, it is always easy to handle—never fights back.



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Even with a light load, it spools uniformly—is never cranky.





Takes Reverse Bends

Takes this "fatigue" much better, as on rope-ruining elevator installations.



Safer to Handle

Worn union-formed ropes handle as safely as new, as broken outer wires lie close to rope.

Always Relaxed

While it is flexible, and pliant, it has the "toughness" to withstand strain and weight.

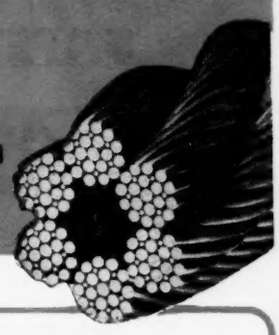


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Resists rotating or twisting in sheave grooves because wires are *Pre*formed.



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union-formed

(preformed)

THE ULTIMATE IN LOW COST WIRE ROPE

Precision Constructed to OUTPERFORM *ordinary Wire Rope*

FIGHT! FIGHT! There is an exhausting fight going on all the time in ordinary wire rope. Each wire is fighting constantly to get out of the fixed position into which it is forced without any preliminary training to put it in shape. This internal fighting spoils the performance, cuts it short, doesn't give you a run for your money.

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Offers New High Type

PERFORMANCE

On Mining Winches, Crab Motors, Mining Machines

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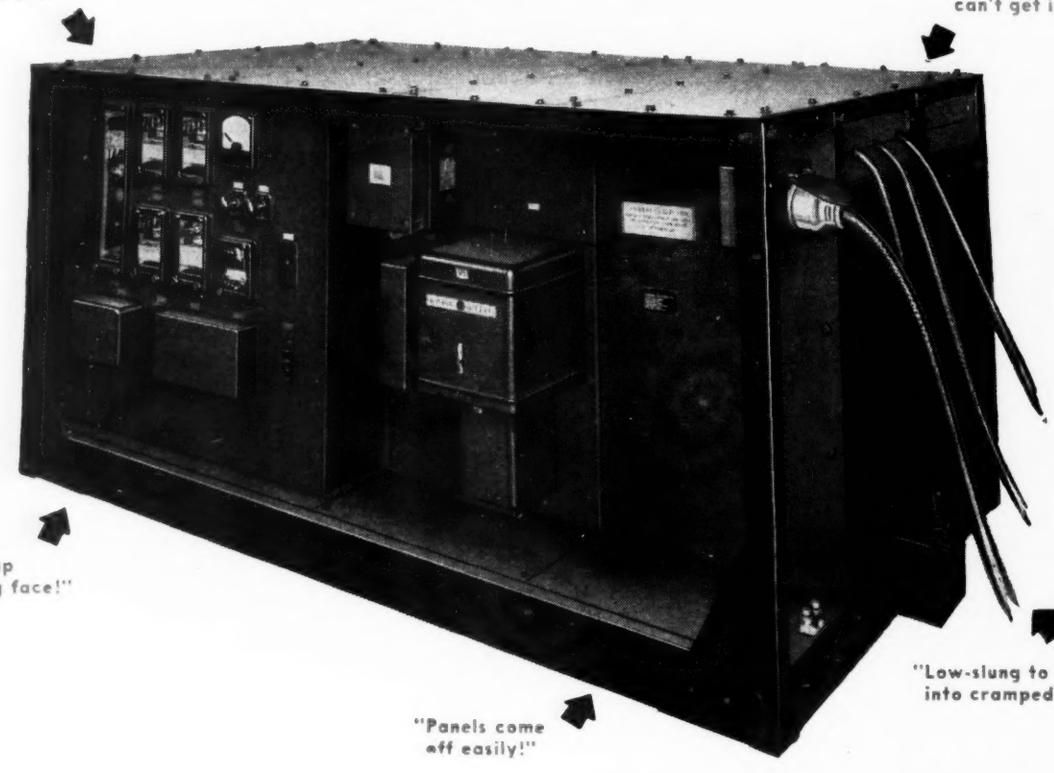
A specialty within a specialty with Union Wire Rope craftsmen and engineers is the making of mining rope ranging from Tuffy Mining Machine ropes up to 4 in. diameter wire rope for the largest strip mining operations. The giant closing machine that makes the latter is 3 stories high and has a maximum capacity of 27 tons of wire rope in one continuous length.

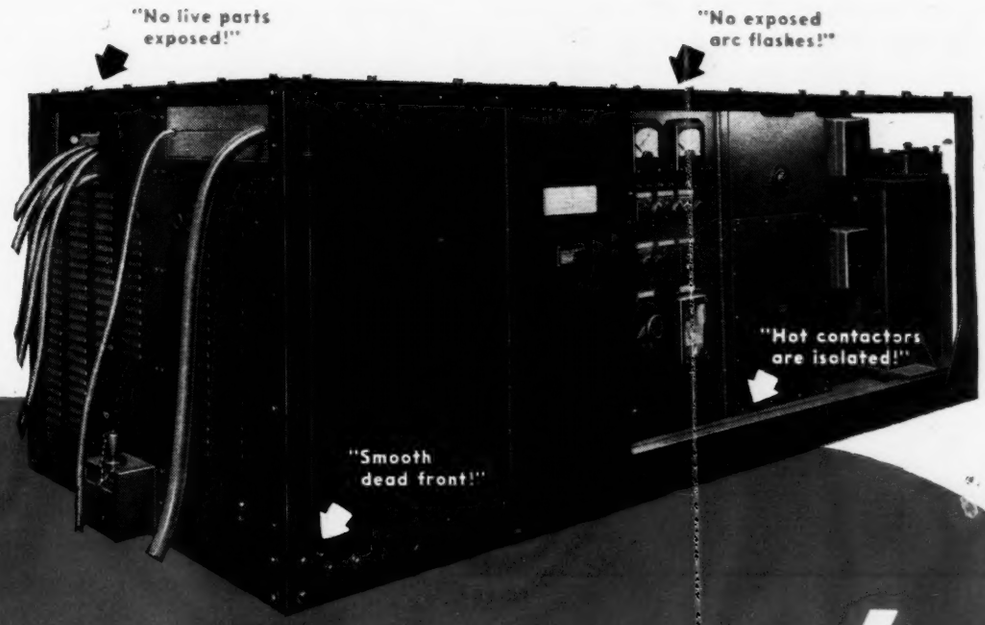
Tuffy mining ropes for crab motors, winches and mining machines are cut to length, coiled, packaged and marked for convenient storage and handling. Tuffy ropes for mining machines have metal clipped ends for quick, easy installation.

In addition to special fabrication for the particular job Tuffys are ***union-formed***, i. e., the strands are ***pre***formed to the exact helical shape they take in the rope. Specify Tuffys for your mining rope needs. Write for special mining rope brochure.

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DESIGNED TO GIVE YOU Greater Safety





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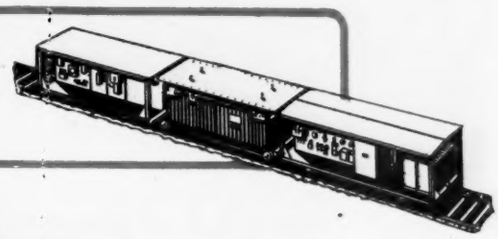
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We've made these new substations particularly easy to inspect and maintain. Top panels are segmented for easy entry into any one section.

All side panels are quickly removed. Swinging doors permit easy access to frequently inspected areas. In other words, even though G-E portable substations are enclosed, your maintenance men can still get at inside controls and wiring quickly and easily.

If you have hesitated to use underground substations because of safety and maintenance problems, here's your chance to get full-voltage power and high output in a safe, easy-to-use equipment. These new portable units can take plenty of abuse and still stay on the job. Write or phone our nearest office for complete details. *Apparatus Dept., General Electric Co., Schenectady 5, N. Y.*

A complete G-E portable rectifier substation consists of automatic a-c switchgear, Pyranol transformer, and rectifier with d-c switchgear. Each unit is car-mounted. Portable substations allow conversion to direct current thousands of feet closer to the working face, thereby making long, low-voltage d-c feeders unnecessary, and assuring full voltage for efficient operation of cutters, loaders, and conveyors.



Portable RECTIFIER SUBSTATIONS

GENERAL ELECTRIC

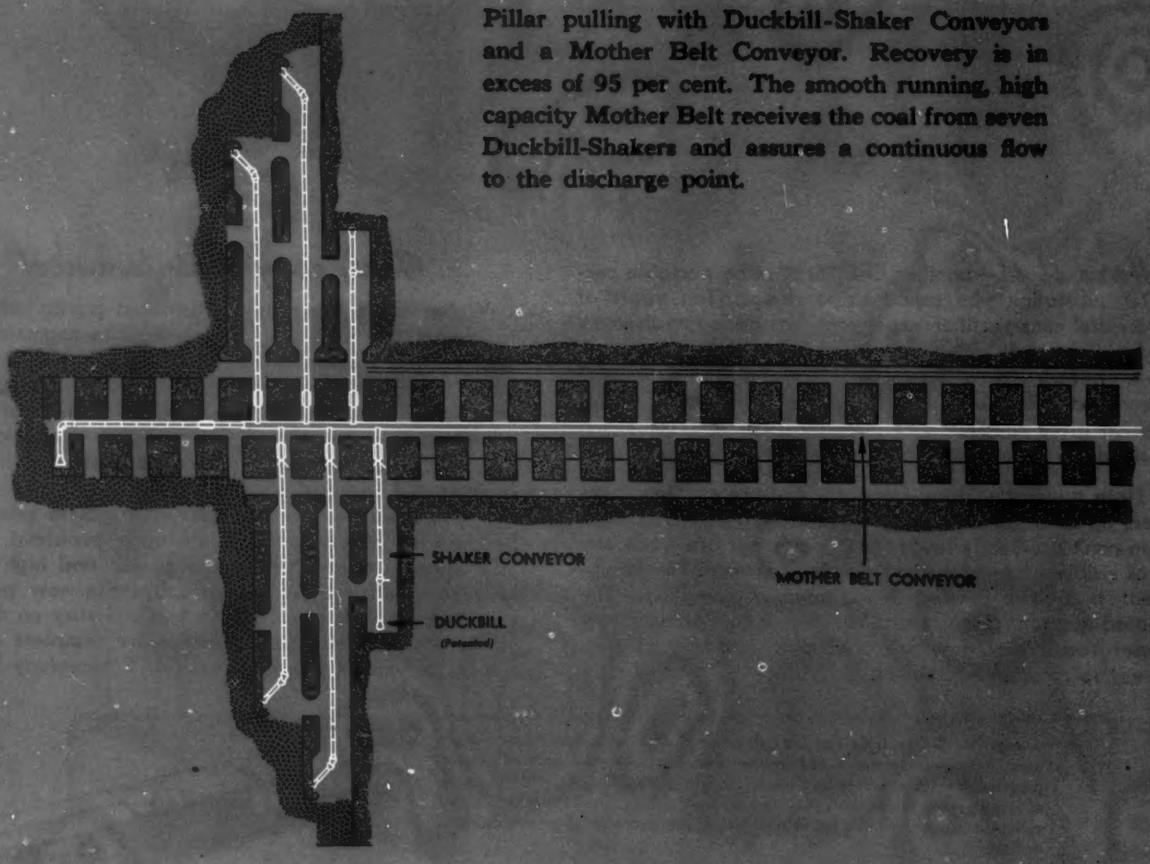
657-52-148, 204

GOODMAN



12193

"Taking in" conveyor sections on a troughed belt. All Goodman belts are reversible and where desired have adjustable speed motors and controls . . . low speed for moving men or supplies to working areas, higher speeds for delivery of coal.



Pillar pulling with Duckbill-Shaker Conveyors and a Mother Belt Conveyor. Recovery is in excess of 95 per cent. The smooth running, high capacity Mother Belt receives the coal from seven Duckbill-Shakers and assures a continuous flow to the discharge point.

GOODMAN MANUFACTURING COMPANY

Wilkes-Barre • Pittsburgh • Huntington • Terre Haute

BELT CONVEYORS

CAPACITIES UP TO 500 TONS PER HOUR
LENGTHS UP TO 3000 FEET

Goodman belt conveyors are made up of rugged but light sectional units that permit quick and easy installation, extension or relocation at low labor cost and a great saving of time. Adjustable head pulleys aid in training the belt and self cleaning tail pulleys keep return belts clean. Tandem drives reduce belt tension and wear.



12176

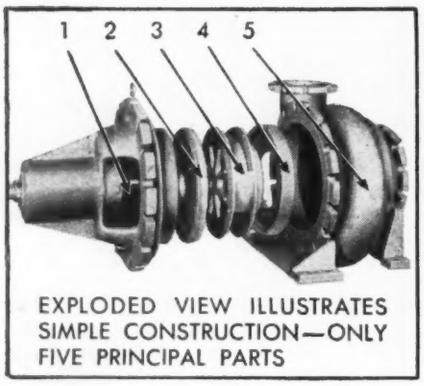
HALSTED STREET AT 48TH • CHICAGO 9, ILLINOIS

Birmingham • Denver • Salt Lake City

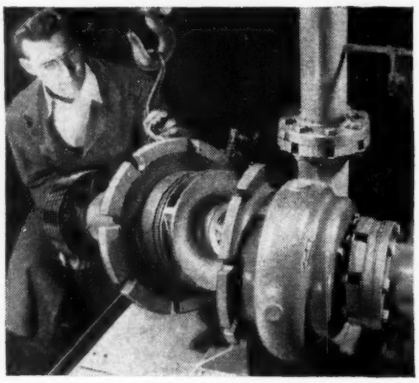
Parts Inventory Cut Much as 2/3

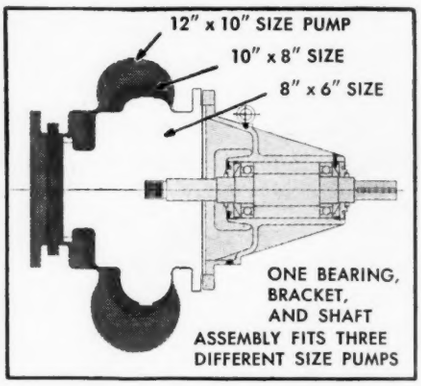
—WITH A-C'S GREAT NEW "SOLIDS-HANDLING" PUMP!

And You Get 2 to 4 Times Longer Life Than With Ordinary Pumps—Materially Reduce Down-Time!



EXPLODED VIEW ILLUSTRATES SIMPLE CONSTRUCTION—ONLY FIVE PRINCIPAL PARTS



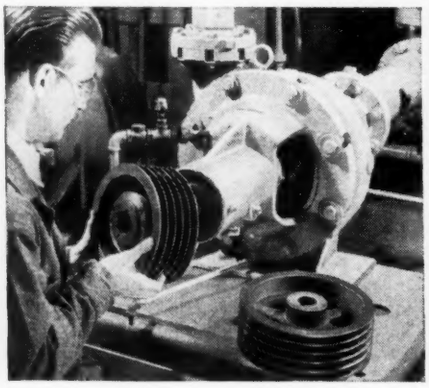


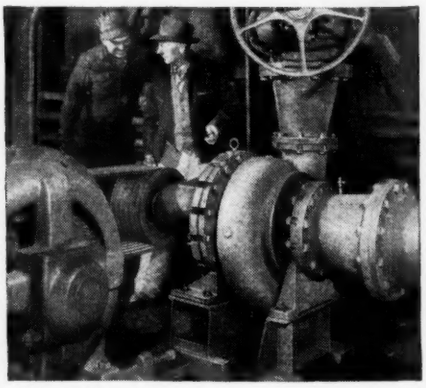
1 Yes, where a *number of comparable* size pumps are used, parts inventory can be cut much as ⅔; and *materially* where 1 or 2 are used! One reason is *simple* design, *fewer* parts. This pump's so designed that . . .

2 You can remove *entire* rotating element without disturbing suction or discharge piping — take apart, re-assemble entire pump fast as ½ hour! And new pumps can *pay off* in parts inventory alone, since . . .

3 Comparable size pumps of different ratings have interchangeable parts. Example: 8 x 6, 10 x 8, 12 x 10 sizes have *same* bearings, bracket, shaft assembly. You stock *1* set of parts for *3* pumps! That's not all . . .







4 These new pumps give you *2 to 4 times longer life* than ordinary pumps! Reasons: *new* design, *special* alloys. What's more, they compare favorably in price with ordinary high efficiency pumps! And *range?*

5 You get *wide* capacity range, up or down, *without* touching pump or parts — *not even impeller!* Only change is motor and drive, or drive alone. Yes, it all adds up to: longer life, lower initial cost . . .

6 . . . lower operating cost, fewer parts — *a new low cost per ton of solids handled!* Here's what one operator reports — "Downtime cut 400%; power savings over $7 a day; parts inventory cut 70%!" A 1913

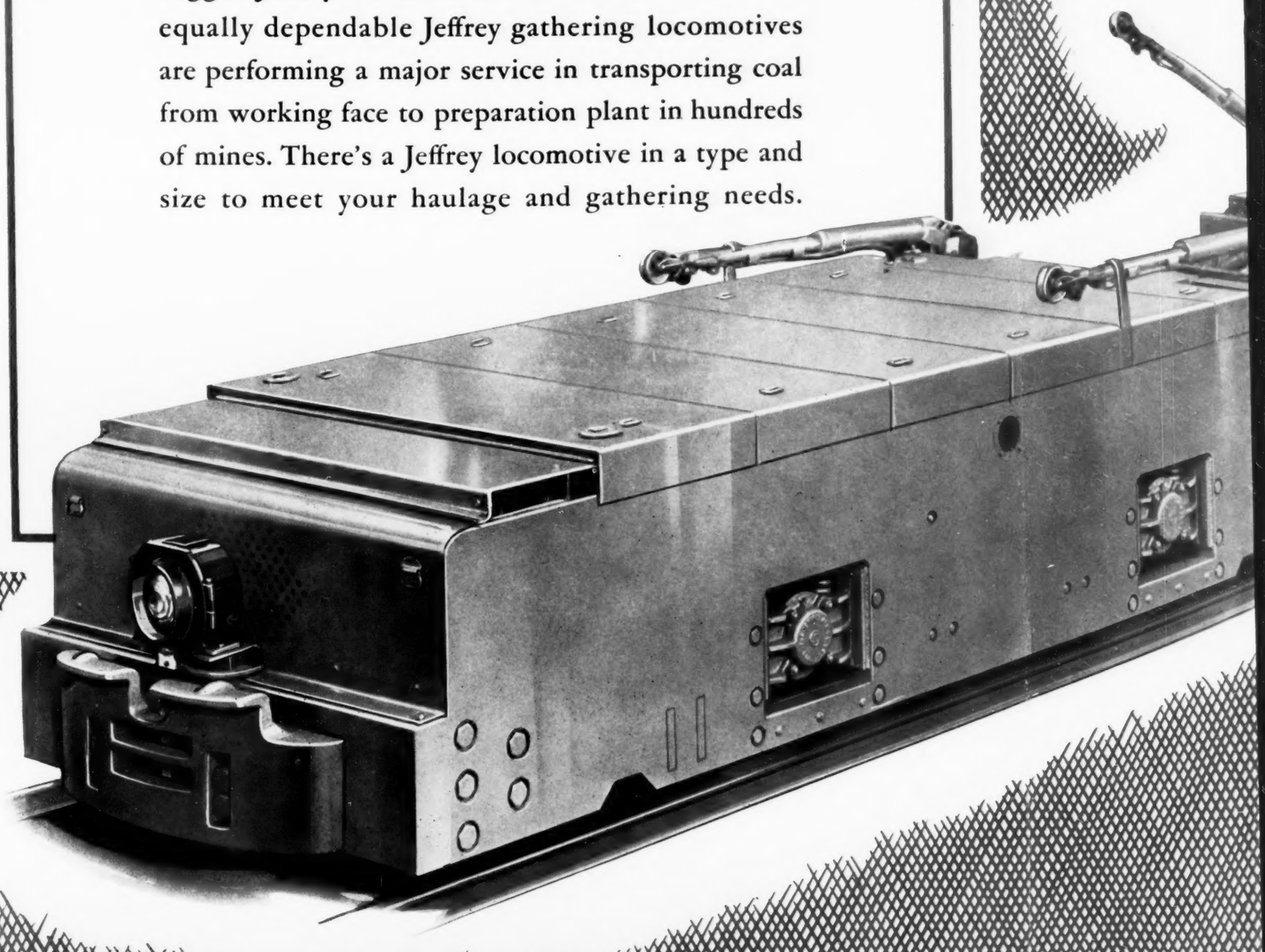


WANT MORE FACTS? Call this experienced engineer in your nearby A-C district office. Discuss your pumping problem with him. Or, Write direct for Bulletin B6381. ALLIS-CHALMERS, MILWAUKEE, WIS.

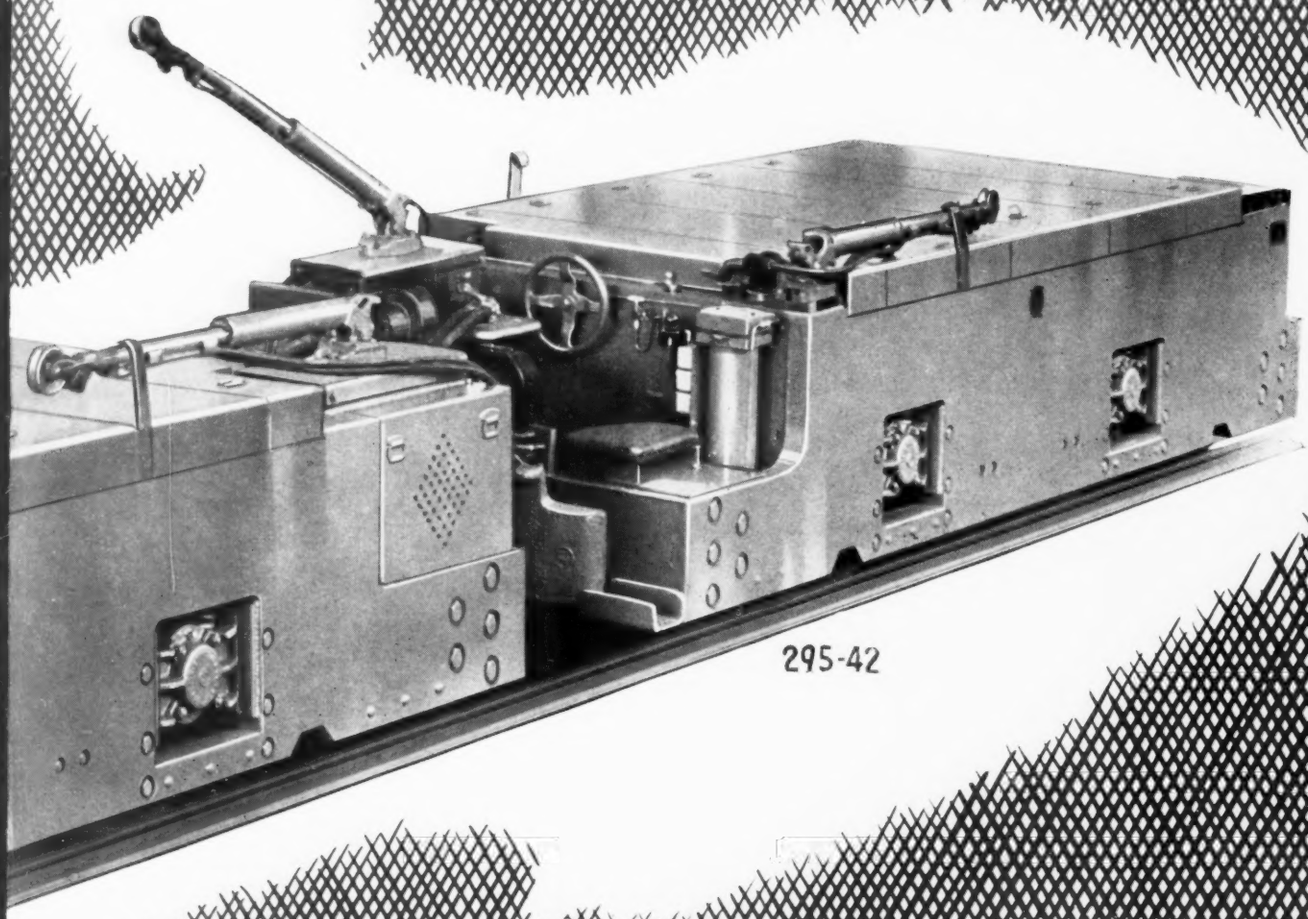
ALLIS-CHALMERS
"Solids-Handling" Pumps

JEFFREY HA
LOCO

● Illustrating a Jeffrey tandem locomotive for handling greater tonnages—easier—faster. Heavy duty, rugged Jeffrey locomotives like these, teamed with equally dependable Jeffrey gathering locomotives are performing a major service in transporting coal from working face to preparation plant in hundreds of mines. There's a Jeffrey locomotive in a type and size to meet your haulage and gathering needs.



HAULAGE COMOTIVES



295-42



DID YOU KNOW?

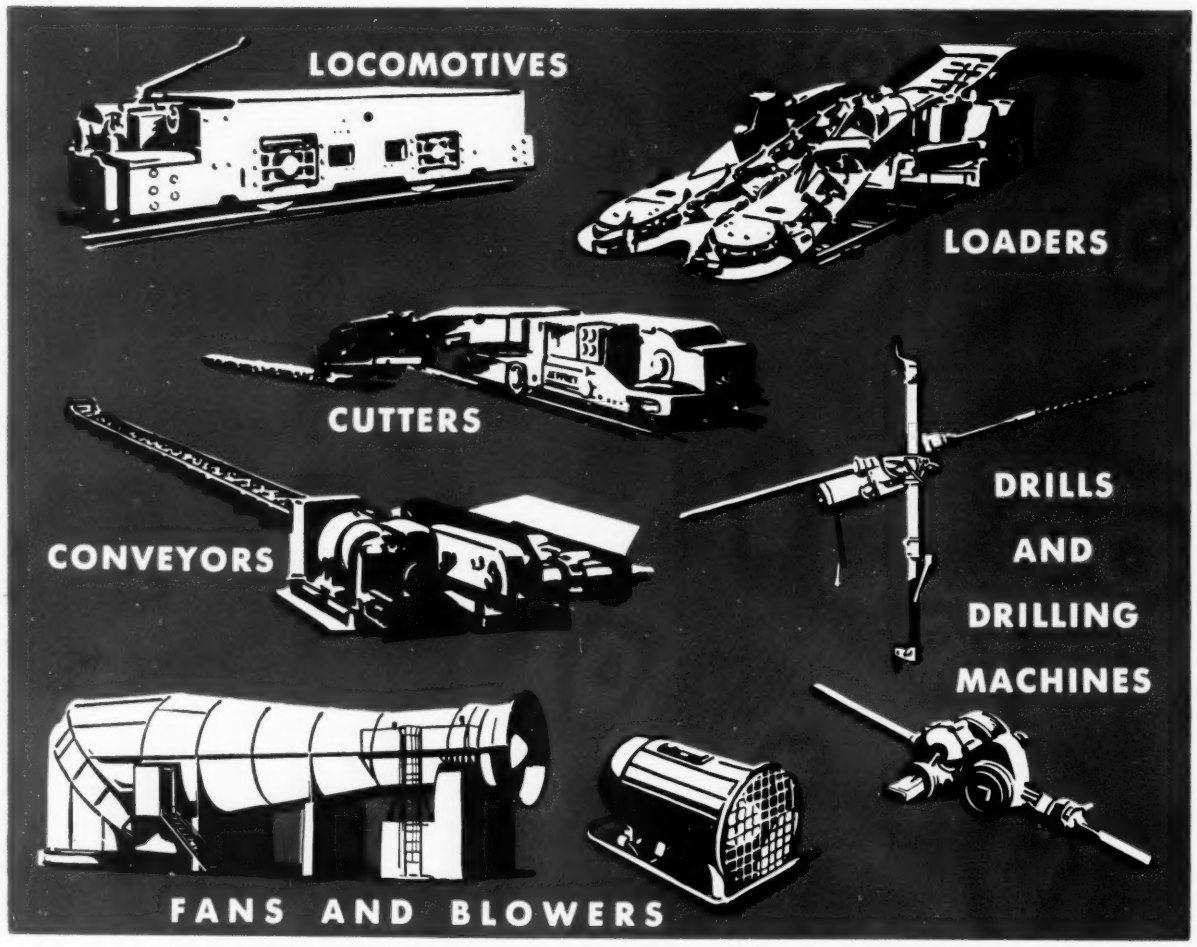
That ninety-five million tons, or one out of every 6½ tons of bituminous coal mined last year, went into the making of steel and chemicals.

That Jeffrey built locomotives with flush-side frame construction over 30 years ago.



Jeffrey
EQUIPMENT FOR COAL MINES

JEFFREY SERVICE TO THE COAL MINES
MEANS SERVICE TO ALL INDUSTRY



THE JEFFREY MANUFACTURING COMPANY

Established in 1877

912-99 NORTH FOURTH STREET, COLUMBUS 16, OHIO

Sales Offices: Baltimore, Birmingham, Boston, Buffalo, Chicago, Cleveland, Cincinnati, Detroit, Denver, Harlan, Houston, Huntington, Milwaukee, New York, Philadelphia, Pittsburgh, Scranton, St. Louis, Salt Lake City

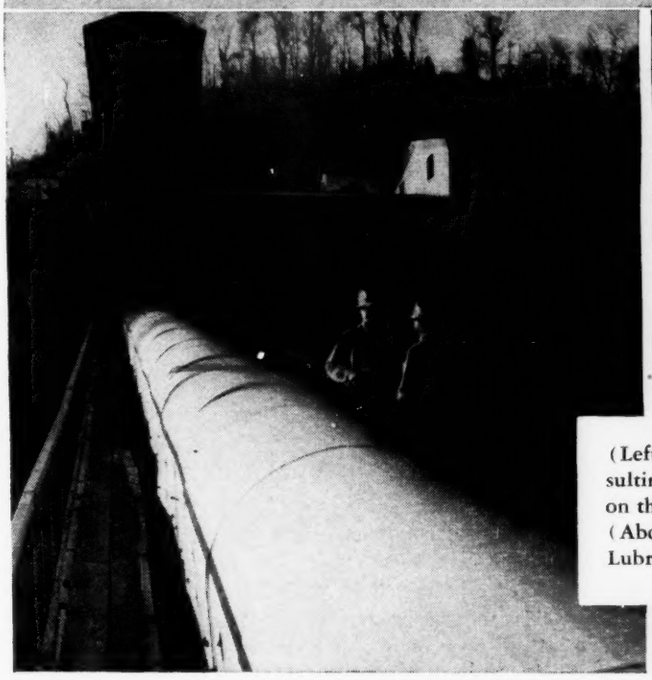
Service Stations: Pittsburgh, Harlan, Ky., Birmingham, St. Louis, Logan-Beckley, W. Va., Scranton

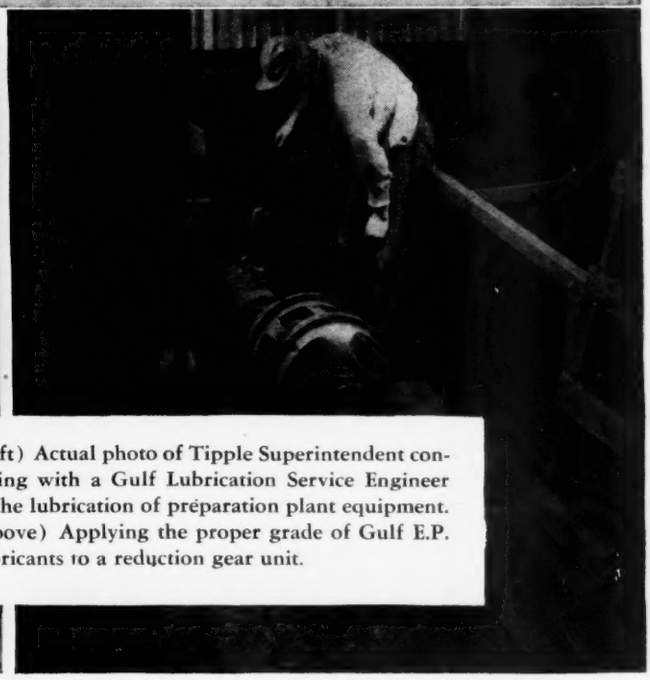
Foreign Plants: Jeffrey Mfg. Co., Ltd., Montreal, Quebec; British Jeffrey-Diamond, Ltd., Wakefield, England; Jeffrey-Galion (Pty), Ltd., Johannesburg, S. A.

"No more shutdowns of our reduction unit

—Thanks to Gulf E.P. Lubricants"

says this Tipple Superintendent





(Left) Actual photo of Tipple Superintendent consulting with a Gulf Lubrication Service Engineer on the lubrication of preparation plant equipment. (Above) Applying the proper grade of Gulf E.P. Lubricants to a reduction gear unit.

"WHEN we used a conventional cylinder oil on our overloaded reduction gear unit, excessive temperatures developed, resulting in frequent shutdowns and lost production," says this Tipple Superintendent. "We solved this problem by switching to Gulf E. P. Lubricants as recommended by this Gulf Service Engineer. Now we get effective lubrication, continuous operation, and greater tonnage output."

Gulf E. P. Lubricants are of the lead naphthenate type, recognized as superior to other types in performance, effectiveness, stability, and lubricating value. Gulf E. P. Lubricants are tenacious, extremely stable, separate readily from water, have a high viscosity index, are non-corrosive and nonfoaming. They are manufactured in a wide range of consistencies to meet every requirement.

Call in a Gulf Service Engineer today and ask him to demonstrate how these superior lubricants can help you get trouble-free service from your reduction gears and lower maintenance costs. Or send the coupon below for further information.

GULF INDUSTRIAL LUBRICATION

Gulf Oil Corporation · Gulf Refining Company

Division Sales Offices:

Boston · New York · Philadelphia · Pittsburgh · Atlanta
New Orleans · Houston · Louisville · Toledo

Gulf Oil Corporation · Gulf Refining Company CA
3800 Gulf Building, Pittsburgh 30, Pa.

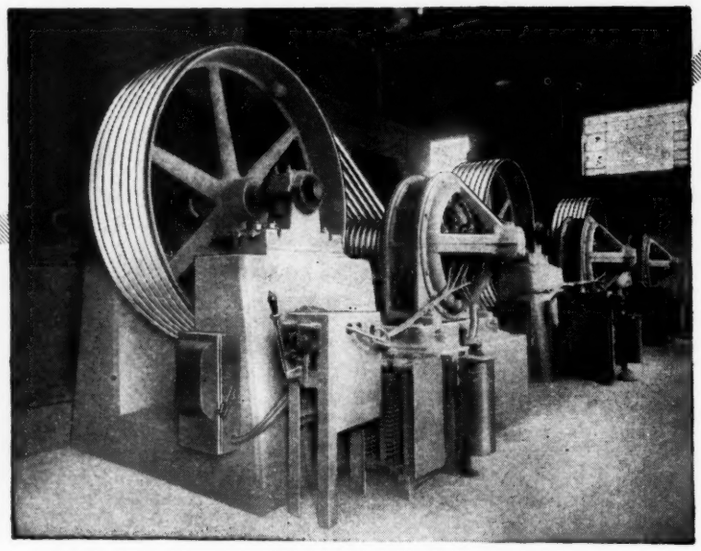
Please send me, without obligation, complete information on Gulf E.P. Lubricants.

Name.....
Company.....
Title.....
Address.....

Here is **WHY**

Your STANDARD Gates Vulco Ropes Are Today Giving BETTER SERVICE Than ANY V-Belts Ever Built Before!

EARLY IN THE WAR, it became perfectly clear that Army tanks, tractors and self-propelled big guns in *combat service* simply *had* to have V-Belts of greater strength and durability than had ever been built before. Gates developed these greatly superior V-Belts through intensified, specialized research — and here is why this fact is now important to YOU: —



✓ **Every Improvement developed by Gates for these Army V-Belts has also been added, day by day, to the quality of the Standard Gates Vulco Ropes which have been delivered to you.**

All Gates V-Belts are Built with *The Patented*



This is one of the very few instances in which improvements developed primarily for military use could be passed on immediately to you. Ordinarily, *you* would have had to wait. An exception was made in the case of Gates V-Belts because it was recognized that industry needed the best possible V-Belts in order to achieve the greatest possible production —and maximum production was vitally essential.

That is why Gates has been able to pass on to you, day by day, every V-Belt improvement developed for our armed forces during the war—and that is why your *Standard* Gates Vulco Ropes are today delivering far better service than *any* V-Belts ever built before!

Gates

THE MARK OF SPECIALIZED RESEARCH

THE GATES RUBBER COMPANY

Engineering Offices and Jobber Stocks in All Large Industrial Centers

469

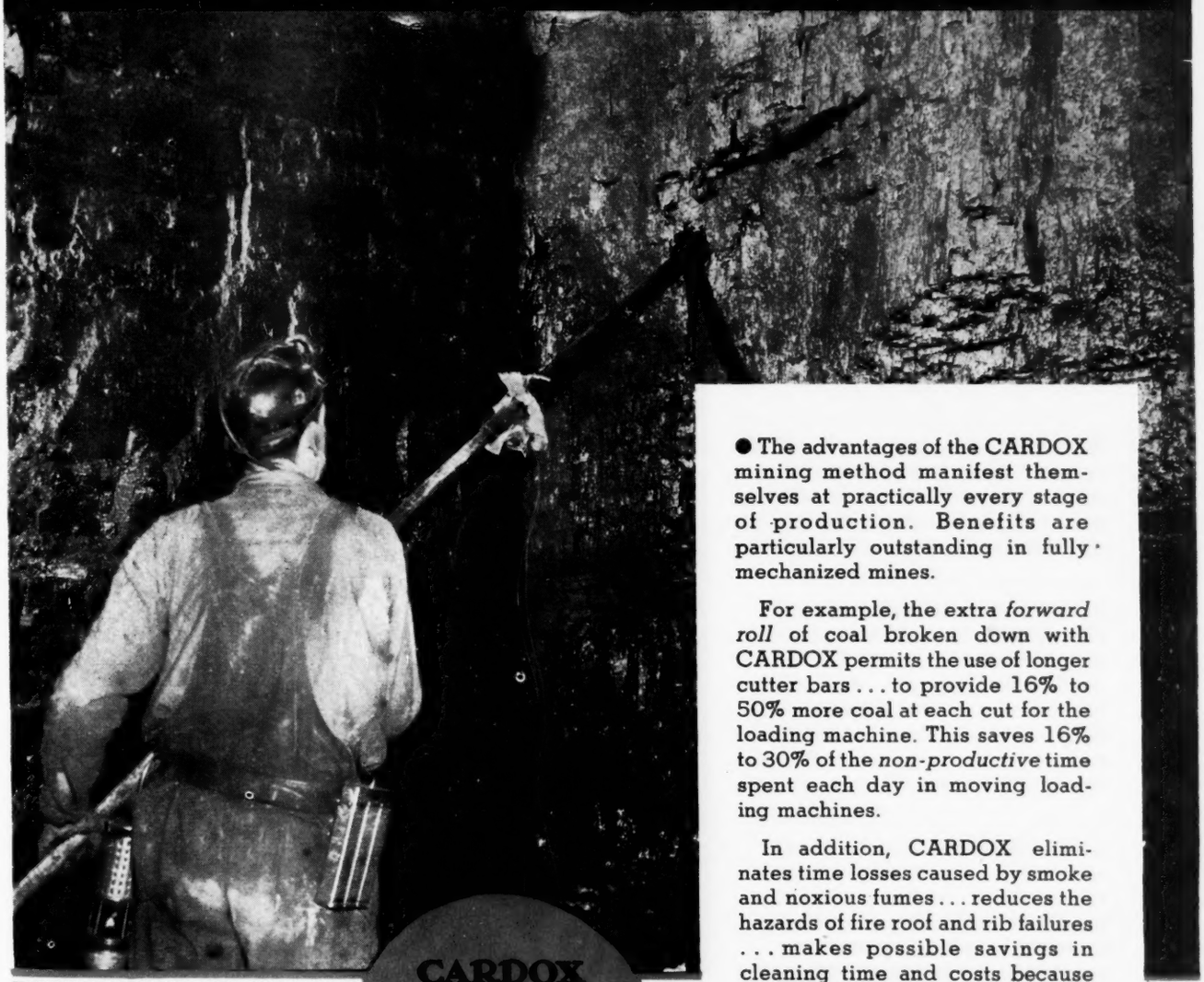
GATES VULCO ROPE DRIVES

CHICAGO 6, ILL., 549 West Washington. NEW YORK CITY 3, 215-219 Fourth Avenue. ATLANTA 3, GA., 521 C. & S. Nat'l Bank Bldg.
LOS ANGELES 21, CAL., 2240 E. Washington Blvd. DENVER 17, COLO., 999 S. Broadway. DETROIT 2, MICH. 223 Boulevard Bldg.
PORTLAND 9, ORE., 333 N.W. 5th Ave. DALLAS 2, TEXAS, 1710 N. Market St. SAN FRANCISCO 3, CAL., 170 Ninth St.

CARDOX

"THE NON-EXPLOSIVE MINING METHOD"

Meets Every Challenge of Today's Production Requirements



● The advantages of the CARDOX mining method manifest themselves at practically every stage of production. Benefits are particularly outstanding in fully mechanized mines.

For example, the extra *forward roll* of coal broken down with CARDOX permits the use of longer cutter bars . . . to provide 16% to 50% more coal at each cut for the loading machine. This saves 16% to 30% of the *non-productive* time spent each day in moving loading machines.

In addition, CARDOX eliminates time losses caused by smoke and noxious fumes . . . reduces the hazards of fire roof and rib failures . . . makes possible savings in cleaning time and costs because of the higher percentage of coarse sizes produced by its gentle heaving action.

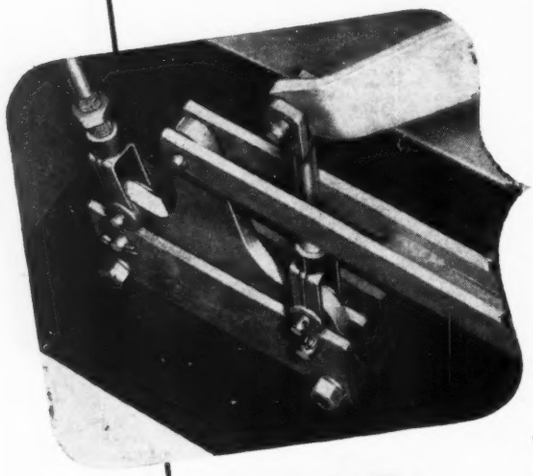
Write for full details on free demonstration in your own mine.

CARDOX
Hardsocg
Drilling Equipment

Complete line of drilling equipment designed to give you the maximum drilling efficiency.

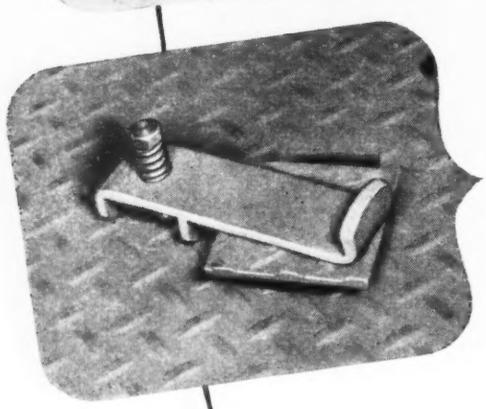
CARDOX CORPORATION • BELL BUILDING • CHICAGO 1, ILLINOIS

HOW TO . .



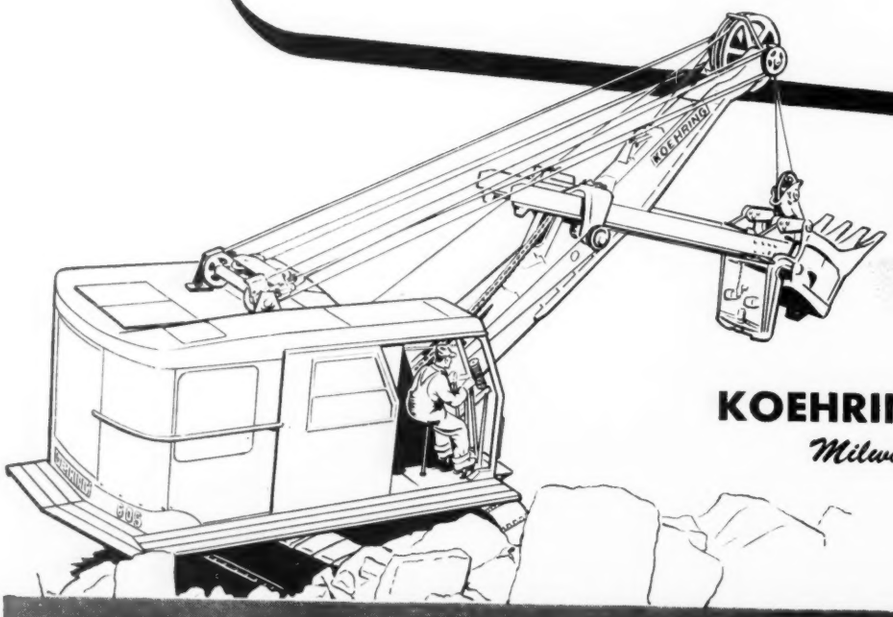
KEEP THE OPERATOR FRESH

A total of 7 hours out of every 8, the shovel operator has his hands on the levers controlling crowd-retract and swing-traction. Make them easier to move and production goes up as operator fatigue goes down. On the Koehring 605, these levers move easily, smoothly, with minimum pull, because double fulcrum units have been built into the linkage. Double fulcrum units eliminate clutch overtravel, increase accuracy of control, give the operator an important mechanical advantage every time he swings, travels, crowds or racks in.



KEEP THE OILER SAFE . . .

With this safety catch set, oiler, or operator, works in complete safety when lubricating the Koehring 605. Main engine clutch cannot be engaged, machinery cannot be set in motion. Safety catch, located on the left front platform, is quickly and easily set and as easily released.



KOEHRING

605

1½ YARD SHOVEL

KOEHRING COMPANY

Milwaukee 10, Wis.

KOEHRING HEAVY DUTY

HEAVY-DUTY CONSTRUCTION EQUIPMENT

"MAKE 'EM TOUGH"



That's the ROEBLING *way with Portable Power Cables*

SURE, STEADY POWER is yours when you specify Roebling for portable power cables. Over jagged rocks and under truck tires, through water and heat and around sharp bends . . . whatever the conditions, they're on the job.

One reason for the rugged efficiency of these portables lies in Roebling manufacturing processes. Illustrated, for example, is a portable cable receiving its tough, protective hide. Rubber composition is fed into this "tuber" and out comes the cable covered with a smooth, strong jacket . . . ready to be "lead-mold cured" for *extra* toughness.

It's all part of the exacting care that goes into the making of Roebling's complete line of electrical wires and cables. Whatever the purpose, there's a correct Roebling cable for it . . . and a Roebling engineer ready to help you select it. Our nearest branch office will gladly provide full information.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON 2, NEW JERSEY
Branches and Warehouses in Principal Cities



Roebling Rubber Portable Cables

Roeclad for high abrasion and impact resistance, and Roecable for extra flexibility, both supplied with or without ground wires.

Roebling Mining Machine Cables

Twin Flat Type with parallel conductors. Also Single Conductor Type specially designed and suitable for mine locomotive reels.

Roebling Parkway Cables

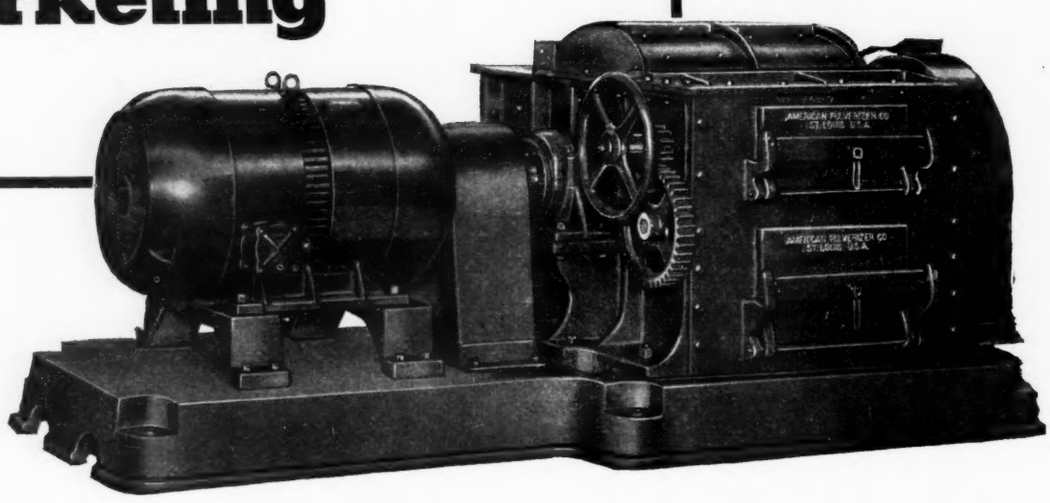
Roesheath for direct burial under severe conditions, used for general power supply for mines, signal circuits, etc. Other types for special conditions.

ROEBLING

ELECTRICAL WIRES AND CABLES

Weatherproof Wire • Service Entrance Cables • Rubber-Covered Wires and Cables (including Thin-Wall Insulated Building Wires and Cables) • Rubber Sheathed Portable Cables • Rubber Insulated Power Cables • Magnet Wire • Telephone Wires • Pigtail and Braided Copper • Trolley Contact Wire • Bare Copper Wire and Strand • Varnished Cambric Power Cables.

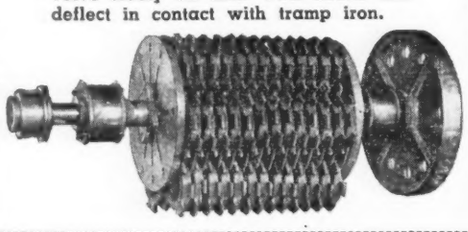
Prepare Coal For Most Profitable Marketing



Uniform Sizing, Minimum Fines And No Oversize with American Crushers



Manganese shredder rings, an exclusive patented feature of Americans are shown below on rotor. The shredder rings, each with 20 cutting teeth, revolve freely on their own shafts and deflect in contact with tramp iron.



Stoker and pulverizer sizes are positively controlled in American Rolling Ring Crushers—through the splitting action of the patented shredder rings revolving at slow speed—instead of the conventional crushing action at high speeds.

Sizing is held in rapid, uniform production—without the wastefulness of fines. Americans are doubly adjustable for great flexibility of sizing to meet seasonable requirements and market conditions.

Americans are available in types to fit your operation . . . . capacities of 50 to 500 TPH.

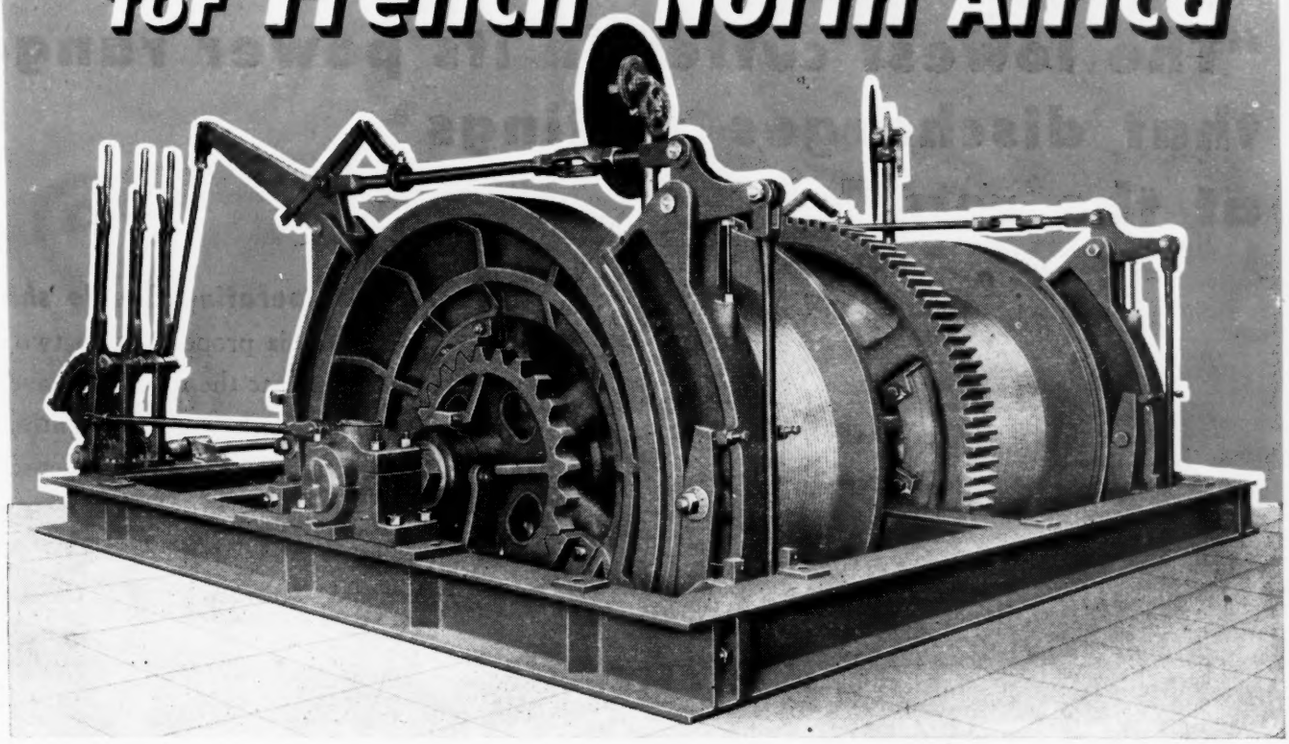
Send for informational bulletin on coal crushing.

American PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

1429 Macklind Avenue
St. Louis 10, Mo.

A Modern Vulcan Hoist for French North Africa



SHOWN above, with gear-guards not yet installed, is one of several Vulcan electric hoists recently shipped to French North Africa for service at isolated mining developments where dependability is highly essential.

Although of moderate size these hoists are of such sturdy construction that maintenance expense should be negligible for many years to come. Their positive toothed-type clutches and heavy-duty post brakes are outstanding features—seldom specified for hoists of this size, yet sure to repay their moderate additional cost many times over in safe trouble-free operation.

Backed by nearly a hundred years of successful experience, Vulcan is building more and better hoists today than ever before and our engineering executives welcome correspondence regarding any present or prospective hoisting problem—no matter how unusual or difficult. Constructive suggestions and preliminary designs will be submitted, so far as possible, without charge or obligation of any kind.

PRINCIPAL SPECIFICATIONS

MOTOR—125 hp., induction type.

GEARS—Double-reduction cast-steel, with machine-cut spur teeth.

DRUMS—Double cylindrical, all-steel; 48" diam. x 33" face, grooved for 2500 ft. of ¾" rope. One rigid and one clutched.

CLUTCH—Positive toothed-type, hand operated.

BRAKES—Parallel-motion post type. Hand operated. 5'-6" diam. x 8½" face. Asbestos lined.

FRAME—Fabricated steel; electrically welded throughout and sectionalized for convenient transportation.

DUTY—Unbalanced load of approximately 7000 lb. to be raised at speed of 490 ft. per minute.

VULCAN IRON WORKS

Established 1849

Main Office and Works **WILKES-BARRE, PA.,** New York Office 50 Church

Heavy-Duty Electric Hoists
Self-Contained Hoists
Scraper Hoists
Car-Spotting Hoists
Room Hoists

Shaking-Chute Conveyors
Chain Conveyors
Cast-Steel Sheaves and Gears
Cages, Skips and Gunboats
Coal-Preparation Equipment

Steam Locomotives
Diesel Locomotives
geared and electric drive
Gasoline Locomotives
geared and electric drive

Load-Carrying Larries
Rotary Kilns, Coolers and Dryers
Crushing Rolls and Pulverizers
Briquetting Machines
Ball, Rod and Tube Mills

the Sullivan 11-B

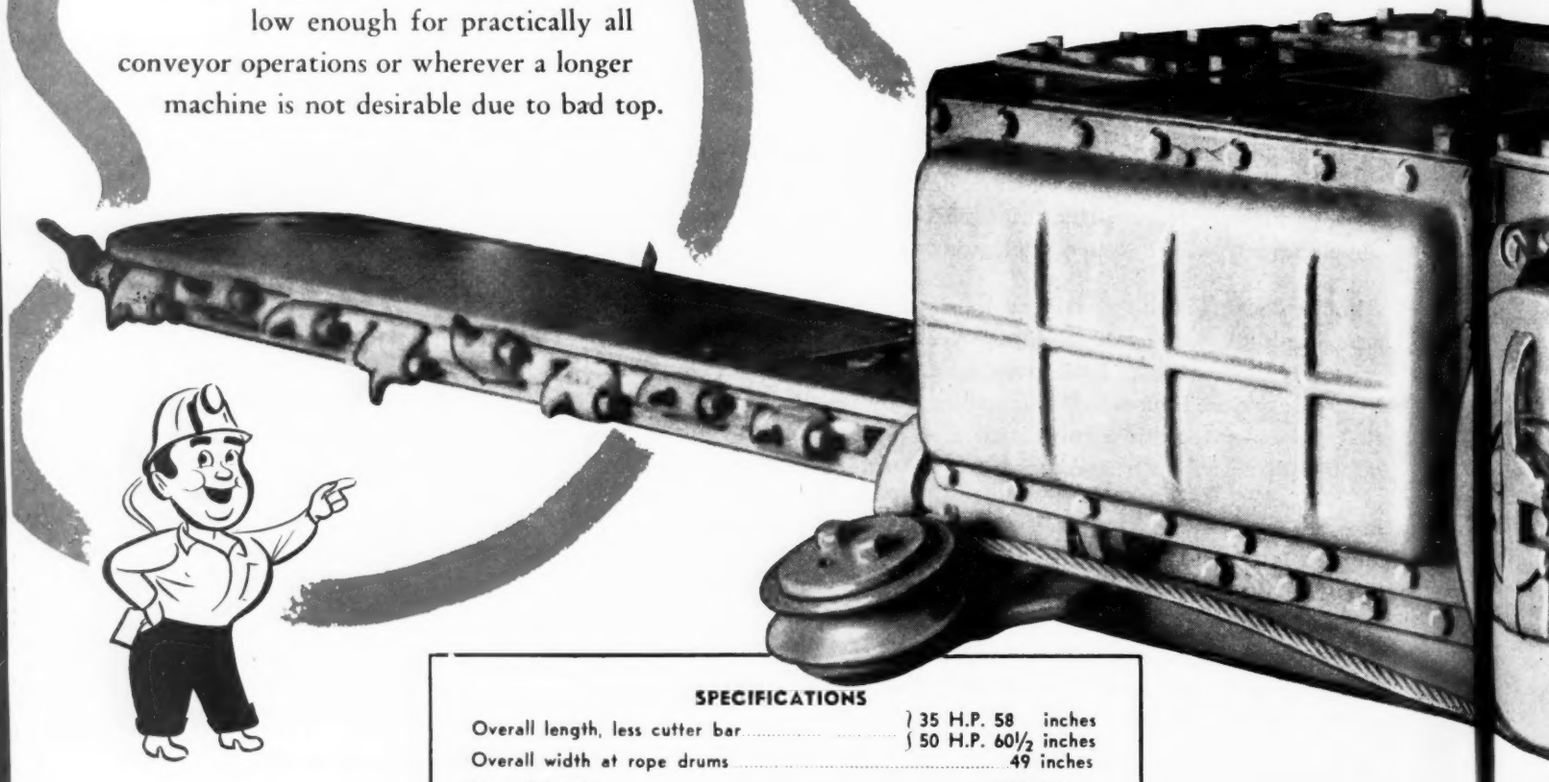
"The lowest cutter in its power range that discharges cuttings at the rear"

Is your mine operating double shift?

A West Virginia property with two 11-B coal cutters reports that the machines have been in double shift operation for many months, and, excluding worn cutter bits and lost set screws, not one cent has been spent for repairs! — Splash lubrication, antifriction bearings and alloy steel gears and shafts are a few of the reasons.

Do you have low coal?

With a bar for cutting a standard kerf, the 11-B is only 21¼ inches high — low enough for practically all conveyor operations or wherever a longer machine is not desirable due to bad top.



SPECIFICATIONS

Overall length, less cutter bar	35 H.P. 58 50 H.P. 60½	inches inches
Overall width at rope drums	49	inches
Overall height	21¼	inches

OFFICES:
Birmingham, Ala.
Butte, Mont.
Chicago, Ill.
Dallas, Texas
Denver, Colo.
El Paso, Texas
Huntington, W. Va.
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New York, N. Y.
Philadelphia, Pa.
Pittsburgh, Pa.
Seattle, Wash.
San Francisco, Calif.
Salt Lake City, Utah
Scranton, Pa.

SULL

Shortwall

Have you bad top? . . .

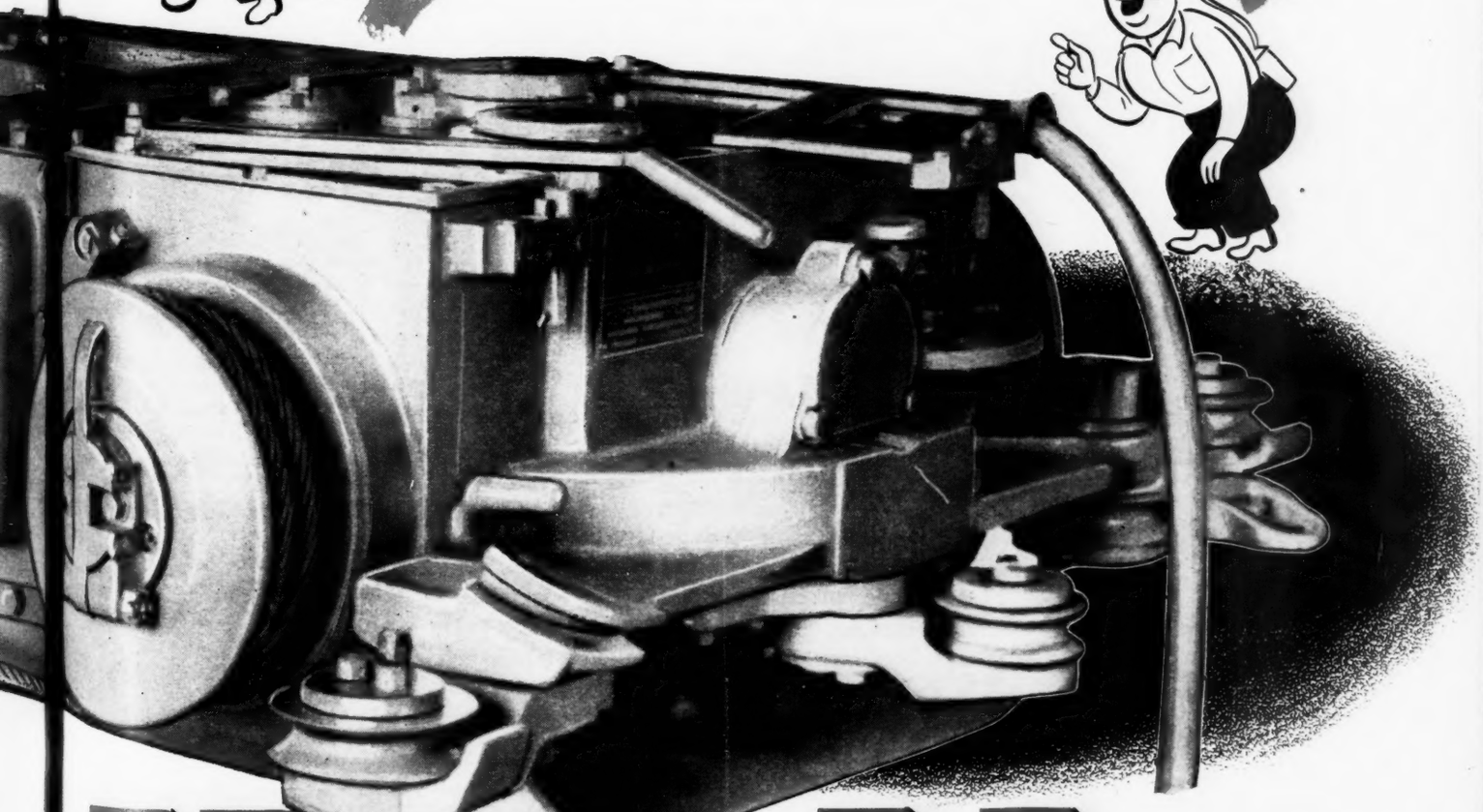
With an 11-B machine the operator need not work under unprotected roof because the cuttings are delivered to rear, all controls are easily handled from rear or side of machine and the 11-B is only 60½ inches long.



Ask for NEW CATALOG

For more complete information on the SULLIVAN 11-B SHORTWALL, ask for a copy of new catalog No. C-31. Address the nearest Sullivan office.

SULLIVAN MACHINERY COMPANY
MICHIGAN CITY, INDIANA
In Canada: **Canadian Sullivan Machinery Co., Ltd., Dundas, Ont.**



IVAN

established 1851

SULLIVAN PRODUCTS
Coal Mining Machines
Slushers - Rock Loaders
Portable Hoists
Car Pullers
Room Hoists
Coal Drills
Air Compressors
Rock Drills
Cutter Bit Sharpeners and Heaters
Core Drills and Contract Core Drilling

Airco Processes Help Break M





CA

MEETING the heaviest demands in their history in the face of the most serious manpower shortage and most stringent restrictions on production of equipment and replacements called for the greatest ingenuity on the part of mining men.

Modern Airco oxyacetylene and electric arc processes described on these pages played an important part in the industry's miraculous accomplishments. They helped to restore worn and obsolete equipment to use and to build new equipment not obtainable from war-converted suppliers.

So helpful have these processes proved that they will, no doubt, play an important part in future mining operations.

If you are unfamiliar with any of the applications listed in this advertisement, Airco's Technical Sales Division will be glad to furnish complete information and assist you in applying them to your own operations.

Electric Arc Welding. Airco's famous "Hornet" and "Wasp" D.C. Arc Welders and "Bumblebee" A.C. Welders serve many of America's mines in building up and restoring locomotive tires (illustrated), loading machine truck wheels, rock crusher heads, etc. They are also widely used for rail bonding, equipment repairs, general fabrication and structural welding.

AIR REDUCTION
60 EAST 42nd STREET
NEW YORK 17, N. Y.

Please send me the following material:

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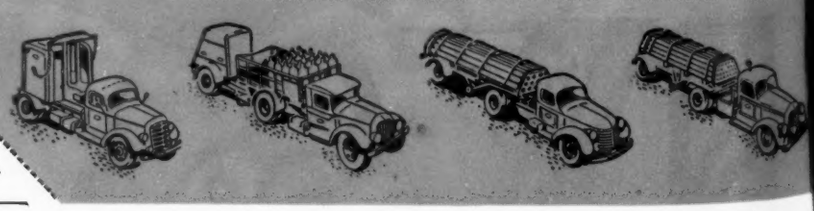
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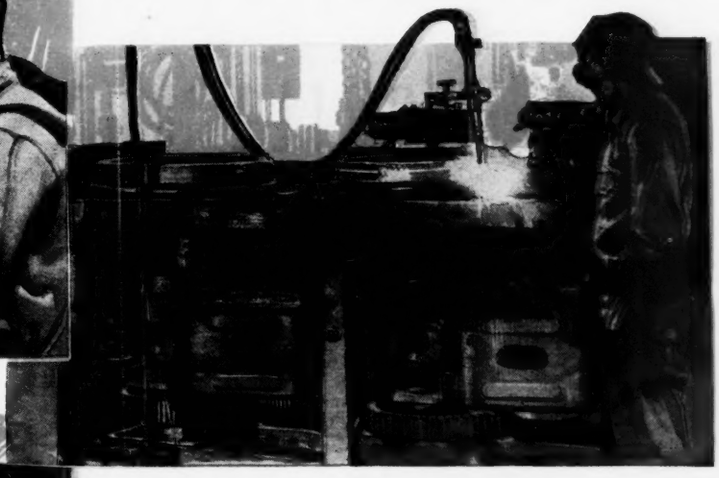
CITY_____ ZONE____ STATE_____



Mine Production Records



Gas Welding and Brazing. Oxyacetylene gas welding and brazing have proved their worth in restoring to service broken parts such as the drive pinion (illustrated) when replacement has been difficult or impossible. Gas welding and brazing have also proved important aids in the construction of equipment and parts.





Machine Gas Cutting serves many purposes on mine properties. In the illustration, false and sharp flanges are quickly removed from mine locomotive wheels. With a special set up, Airco cutting machines are also used in trimming worn rails. Airco Radiagraph portable cutting machines are also useful for accurately cutting steel plate for applications such as car body repairs, car and locomotive parts, etc. Send for catalogs ADC-614 and 627.

Hand Flame Cutting quickly restores worn equipment to service by speeding the removal of damaged parts. It is also useful for many small or occasional cutting jobs, for dismantling steel structures and for preparing scrap for shipment to the mills.



Hardfacing — the application of special alloys to wearing surfaces by the electric arc or oxyacetylene process—restores the usefulness and multiplies service life of many types of mining equipment such as drill bits, clam-shell and dipper bucket edges, crusher parts, etc.

OTHER AIRCO OXYACETYLENE AND ELECTRIC ARC PROCESSES SERVING THE MINING INDUSTRY

- Flame Cleaning of Steel Surfaces
- Flame Hardening
- Flame Heating for Straightening or Bending
- Flame Oxygen Lancing
- Low Temperature Brazing
- Pipe Welding (Gas and Arc)
- Structural Welding
- Rail Bonding

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AIRCO

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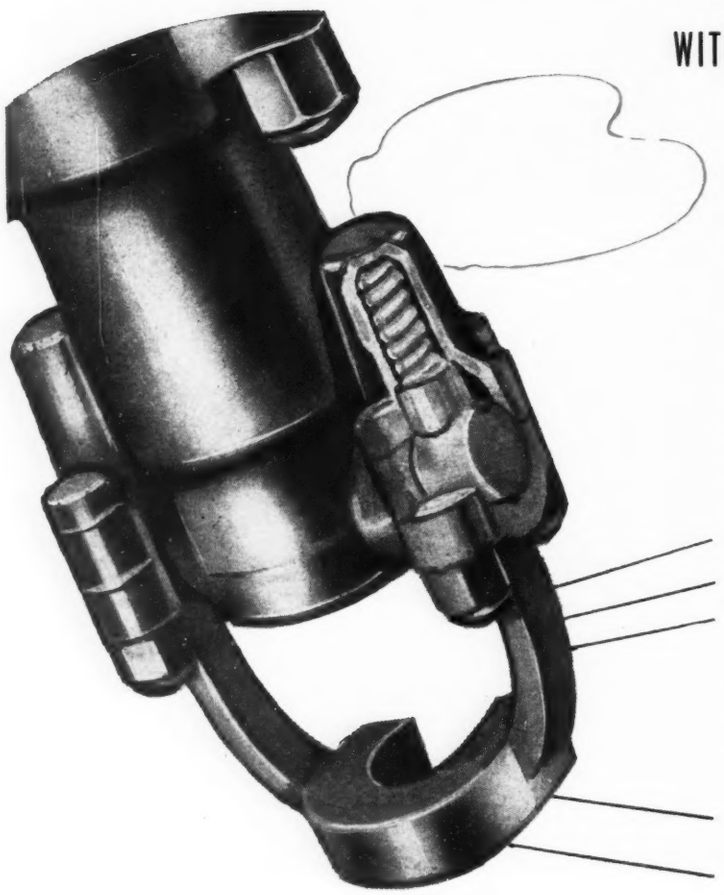
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Represented Internationally By Airco Export Corporation

Why leading operators

The DRILL RUNNER *knows that...*

STEEL CHANGES ARE QUICK AND EASY WITH THOR'S DIRT-PROOF, JAM PROOF STEEL RETAINER



You won't find an operator of a Thor Rock Drill carrying a hammer or pry-bar to pound the retainer free for steel changes . . . because the Thor retainer is easily opened by hand throughout the life of the tool. *Fully enclosed* to prevent jamming by dirt or rock, the tension spring in the Thor retainer cannot be over-tightened. Lubrication is done without dismantling the retainer so it *always* works easily to speed steel changes and reduce friction and wear.

This feature alone makes Thor Rock Drills *preferred* by operators. Add smooth performance and easy handling and you'll see why runners get more footage per shift—every shift—with Thor.

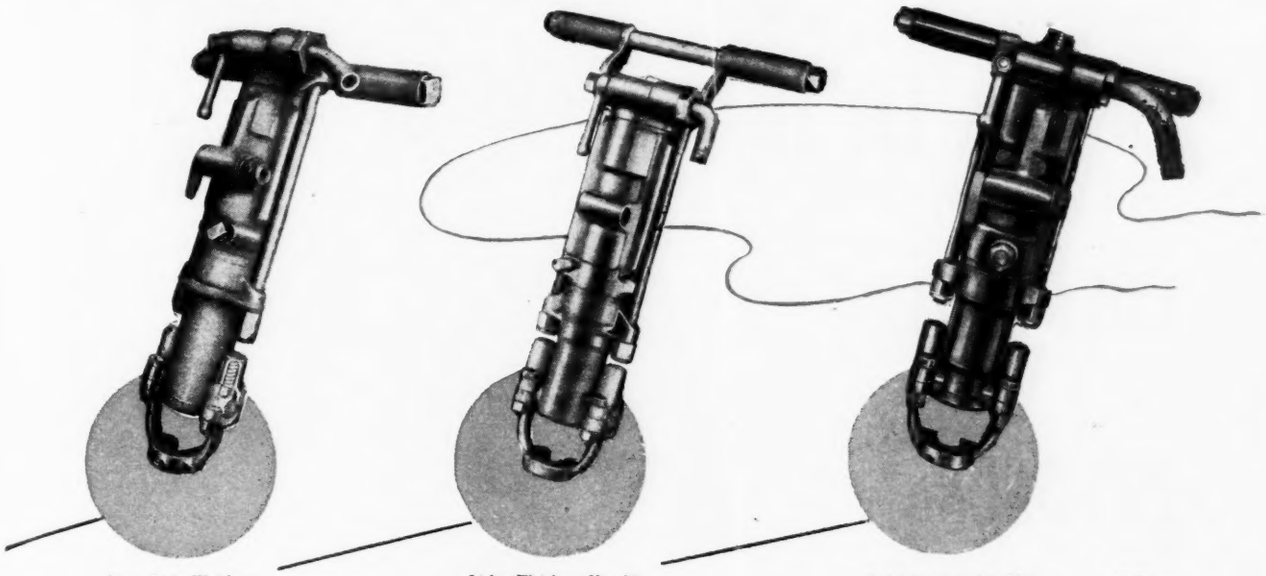
INDEPENDENT PNEUMATIC TOOL COMPANY
600 W. Jackson Boulevard, Chicago 6, Illinois

Birmingham Boston Buffalo Cleveland Detroit Los Angeles
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Thor PORTABLE POWER TOOLS

PNEUMATIC TOOLS • UNIVERSAL AND HIGH FREQUENCY ELECTRIC TOOLS • MINING AND CONTRACTORS TOOLS

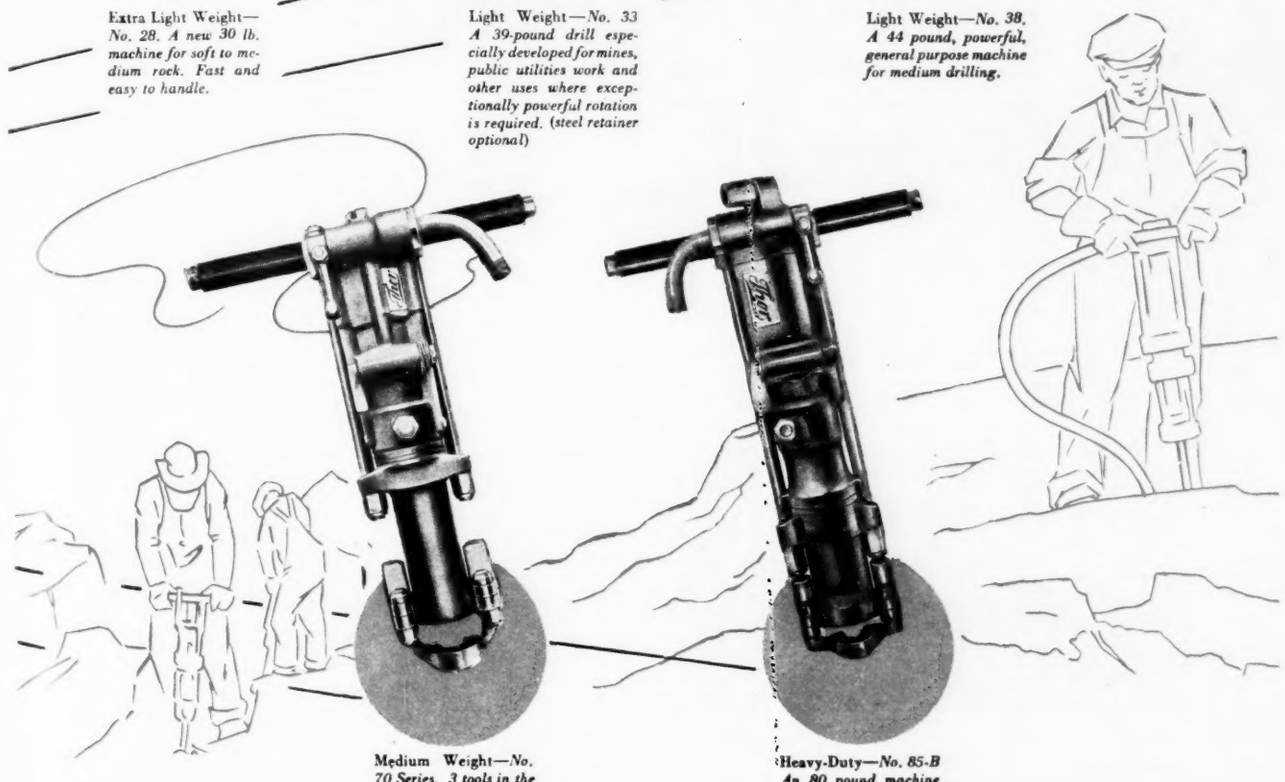
SPECIFY *Thor* ROCK DRILLS



Extra Light Weight—*No. 28. A new 30 lb. machine for soft to medium rock. Fast and easy to handle.*

Light Weight—*No. 33 A 39-pound drill especially developed for mines, public utilities work and other uses where exceptionally powerful rotation is required. (steel retainer optional)*

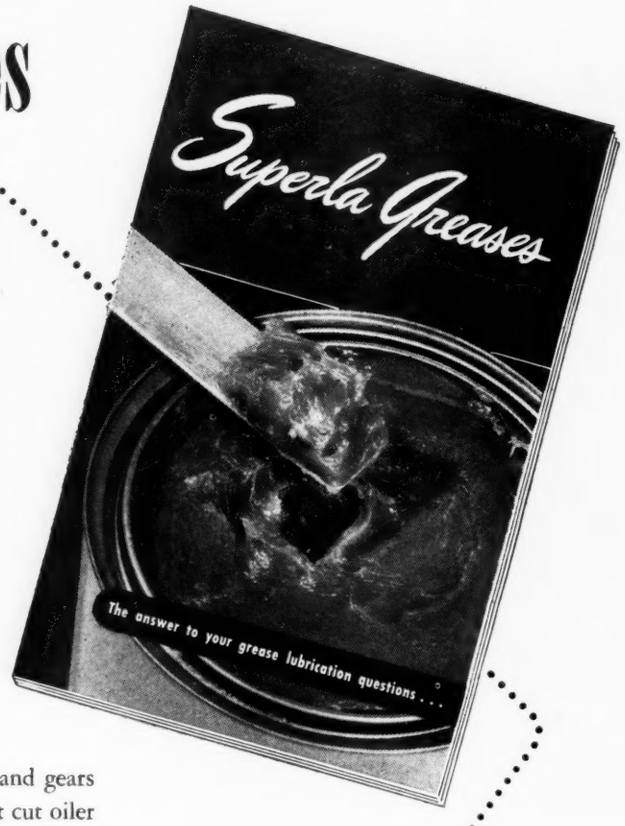
Light Weight—*No. 38. A 44 pound, powerful, general purpose machine for medium drilling.*



Medium Weight—*No. 70 Series. 3 tools in the 55 pound class—powerful and fast for deep-hole drilling in hard rock.*

Heavy-Duty—*No. 85-B An 80 pound machine for deep drilling in the hardest kind of rock formations.*

What qualities to look for in cost-saving greases



QUALITIES that reduce wear on bearings and gears . . . that stop excessive consumption . . . that cut oiler time for servicing equipment . . . these are the qualities you want in a grease. What they are and how you can get them is described in a booklet illustrated at right.

Many of the advantages, which you would expect to find only in special purpose, premium priced greases, are available in a line of 11 grades—including high-temperature greases—called

SUPERLA GREASES

Send for this Booklet

It tells how the most desirable qualities have been incorporated in a complete line of grease to reduce costs on a wide range of Industrial application.

It also has hints on hand packing anti-friction bearings and avoiding over-lubrication.

You can get a copy from the Standard Oil Industrial Service Representative who calls on you or by writing Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

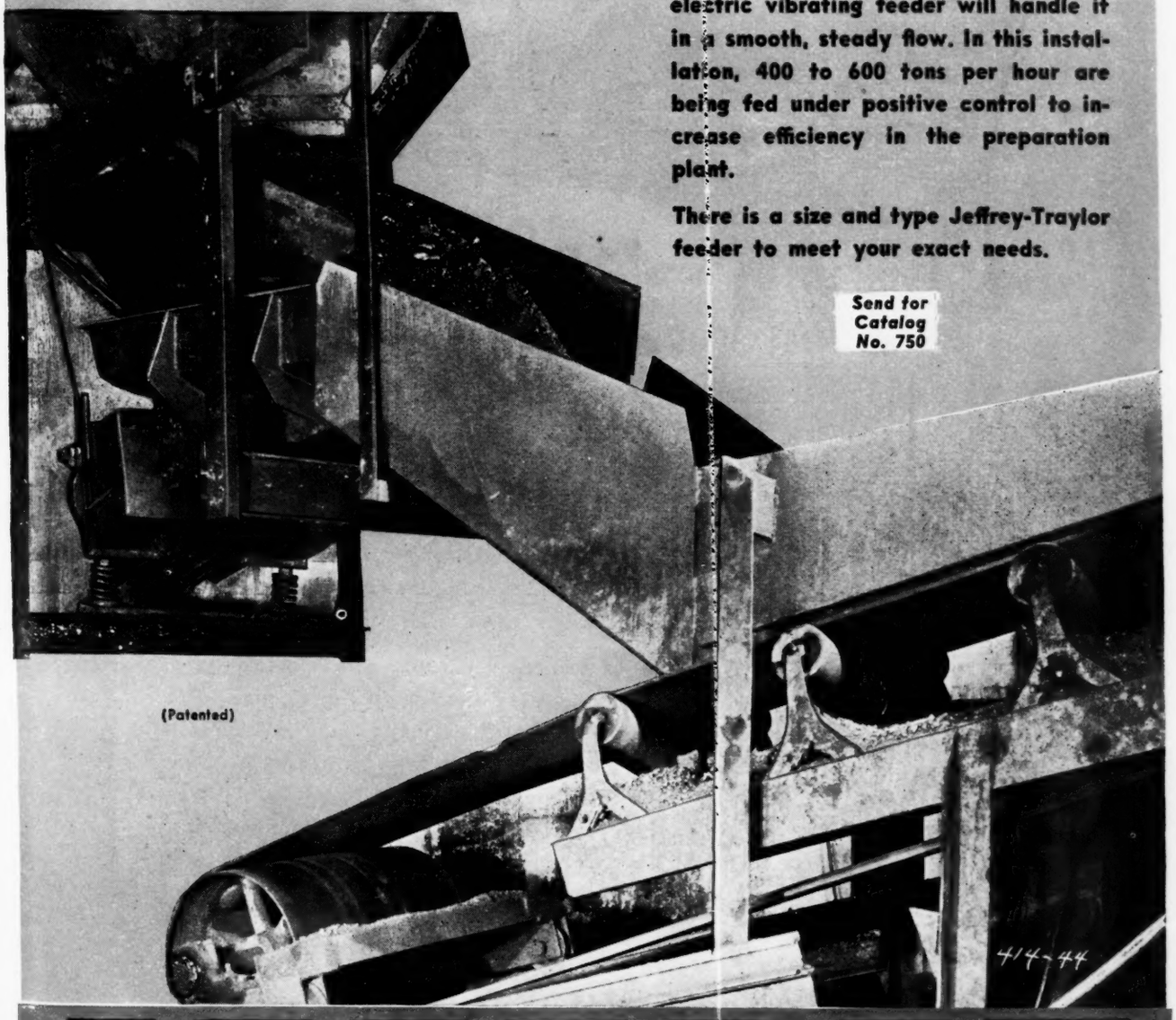
STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE

CONTROLLED >>> HIGH-CAPACITY } FEEDING

Wherever a big volume of coal is to be fed to a conveyor belt, a Jeffrey-Traylor electric vibrating feeder will handle it in a smooth, steady flow. In this installation, 400 to 600 tons per hour are being fed under positive control to increase efficiency in the preparation plant.

There is a size and type Jeffrey-Traylor feeder to meet your exact needs.

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THE JEFFREY MANUFACTURING COMPANY

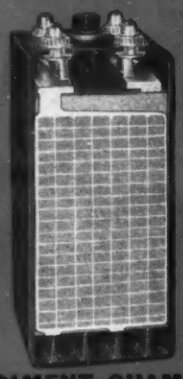
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Do you have **RESERVE POWER** for *Emergencies?*



SEDIMENT CHAMBER
Kathanode-Unit protection permits larger plates and greater capacity in same over-all size battery cell.



Gould Kathanode power helps your shuttle cars to meet unexpected situations. In an emergency there is current for sustained speed or for adding another load or two during a busy day.

In a Gould Kathanode battery the extra protection of the famous Kathanode Unit minimizes active-material losses. A smaller sedimen chamber is practical. That means larger plates, actually a larger battery in the same over-all size container. Under ordinary conditions a Gould Kathanode does not work at full power. In an emergency you can depend on it for reserve power.

Write Dept. 113 for Catalog 300 on Gould Kathanode Glassklad Batteries for Mine Shuttle Car Service.

GOULD STORAGE BATTERY CORPORATION, Depew, N. Y.

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GOULD
GLASSKLAD CONSTRUCTION
KATHANODE

Do you expect enough from your trucks?

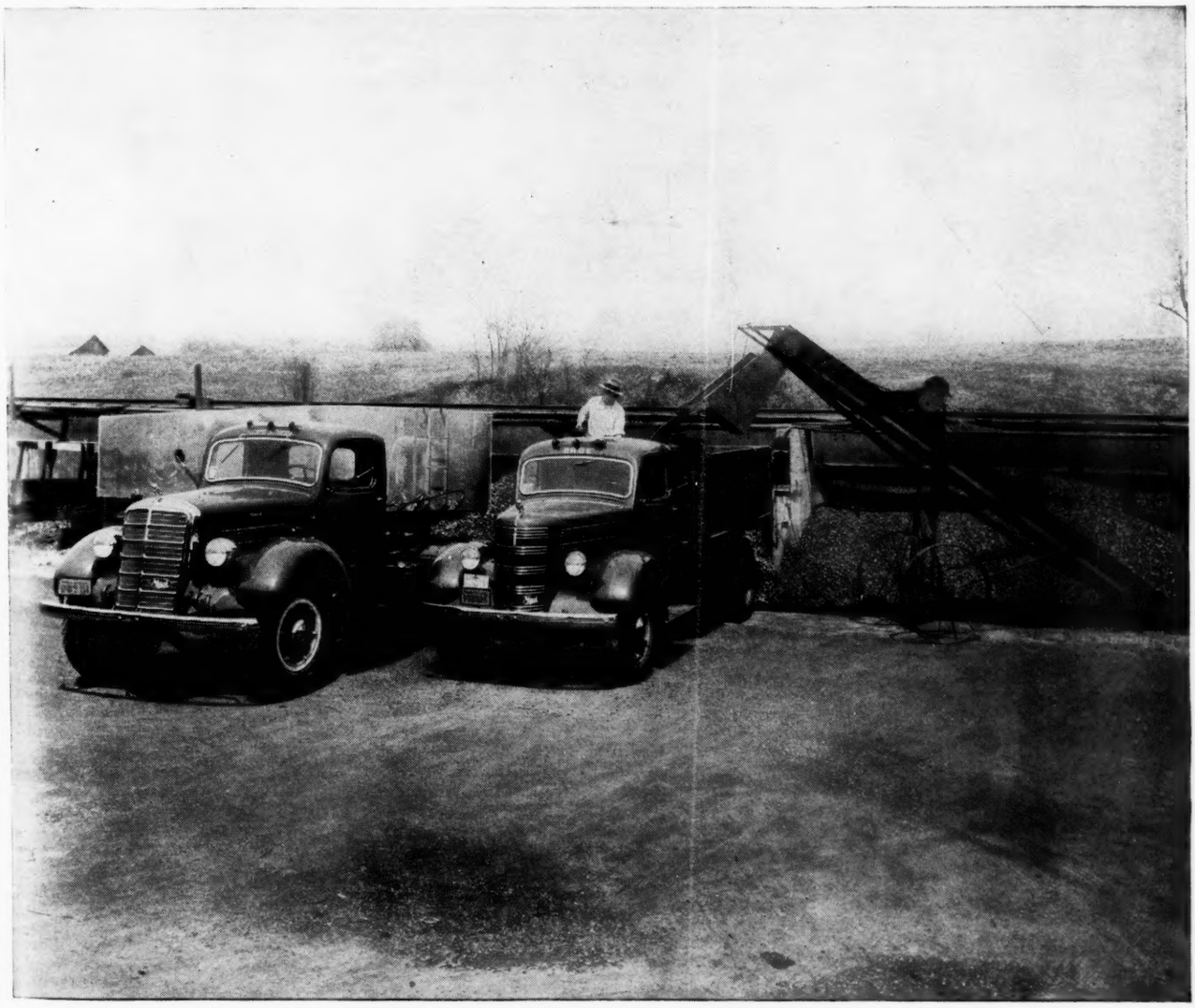
Now that the new ones are becoming available, it's time to take a fresh look at your basic conceptions about trucks.

Did it ever occur to you—you may be setting your sights *too low*?

Unless you use a Mack, you don't realize what an amazing performance a really tough truck can deliver, how hard it can work, how long, how economically.

Unless your standards of truck performance are based on Macks, you're probably putting up with less than you *could* get, and doing yourself out of cold cash.

Get hard-boiled about trucks. Get a truck that earns its keep—a Mack. Macks are products of 46 years of experience in building trucks that deliver more work per dollar of investment. That's why they're made with tetrapoid instead of conventional gears; with rubber Shock Insulators instead of ordinary spring shackles; with liberal use of heat-treated steel alloys. When you build a truck that way, though it costs a little more at first, *it costs a lot less in the end.*



Mack Trucks, Inc., Empire State Building, New York 1, N. Y. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J.; Long Island City, N. Y. Factory branches and dealers in all principal cities for service and parts.

Mack
TRUCKS
FOR EVERY PURPOSE



Performance Counts!



. . . far More than a Selling Point

Far more than a selling point in competitive domestic and industrial markets, "Heavy-Media Cleaned" Coal brings worthwhile advantages and economies from the face of the seam to the customer's siding.

Heavy-Media Separation permits full utilization of *all* the advantages of mechanized mining. Its razor-sharp separation of slate, bone and rock from marketable coal practically duplicates the washability curves. Multiple-product separation can be made on any run-of-mine feed in a full size-range. Once the separating gravity is set, it can be maintained within ± 0.01 . . . yet quickly changed if the feed or the need changes. Continu-

AMERICAN CYANAMID COMPANY

ous reclamation from both coal and refuse minimizes the medium-cost. Heavy-Media Plants can be started or shut down quickly and easily without bank-loss of coal or medium.

No other process approaches Heavy-Media Separation in accuracy of separation and flexibility of operation.

These are not claims, they are facts . . . facts proved to the complete satisfaction of leading operators . . . facts being translated into actuality in Heavy-Media Coal Cleaning Plants that are now being designed and constructed.

Yes, "Heavy-Media Cleaned" Coal is far more than a selling point . . . far more than an abstract theory to be studied in a schematic flow sheet. It is a practical process now treating millions of tons of fragmentary materials yearly.

Several progressive operators have already gained many months on competition by completing the steps preliminary to operating Heavy-Media plants. Cyanamid welcomes the opportunity to work with you or your contracting engineers, to run carload tests on your coal, to consult on design details, to give you the benefit of all we have learned about the application of Heavy-Media Separation.

If you have not received a copy of Ore Dressing Notes #13, describing Heavy-Media Separation with particular reference to coal preparation, or Ore Dressing Notes #14 giving a general description of the Heavy-Media Separation Process, we will be glad to send copies without cost or obligation.

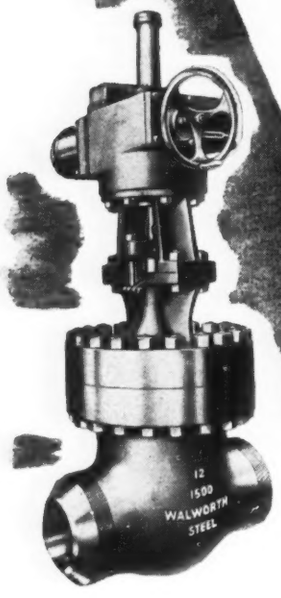
AMERICAN CYANAMID COMPANY PRODUCTS

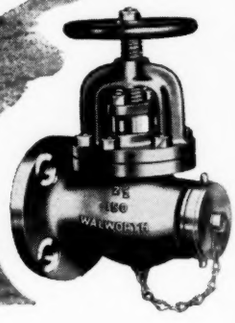
30 Rockefeller Plaza, New York 20, N. Y.

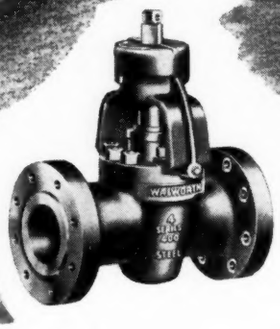


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MANUFACTURERS OF QUALITY VALVES AND PIPE FITTINGS FOR 104 YEARS













In the Walworth line there's a valve for every job, engineered to assure maximum economy of operation and trouble-free performance. Each Walworth valve has ALL the latest features of advanced design that are required for the service for which the valve is recommended.

Walworth Catalog 42 gives full information on the Walworth complete line of steel, iron body, bronze and lubricated plug valves, as well as a complete line of fittings. Your copy may be obtained upon request. Write for it today.

Walworth VALVES AND FITTINGS

60 EAST 42nd STREET, NEW YORK 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD



IT'S a very expensive luxury to send a mine locomotive about the mine on office boys' work. You could get your messages through much quicker, much cheaper and much more satisfactorily by installing telephones throughout your mine in strategic locations.

Mine telephone cables, as made by Simplex, have a hard service rubber jacket and the famous ANHYDREX insulation which effectively resists absorption of water. ANHYDREX mine telephone cables have very good talking qualities and assure clear, uninterrupted telephone conversation.

Speed up your operations, use your labor and equipment to better advantage and save both time and money by installing telephones connected by Simplex-ANHYDREX mine telephone cables.

Simplex Wire & Cable Co., 79 Sidney Street, Cambridge 39, Mass.

Simplex
WIRES and CABLES

From End to End of Power Piping Uniform Quality Stands Guard

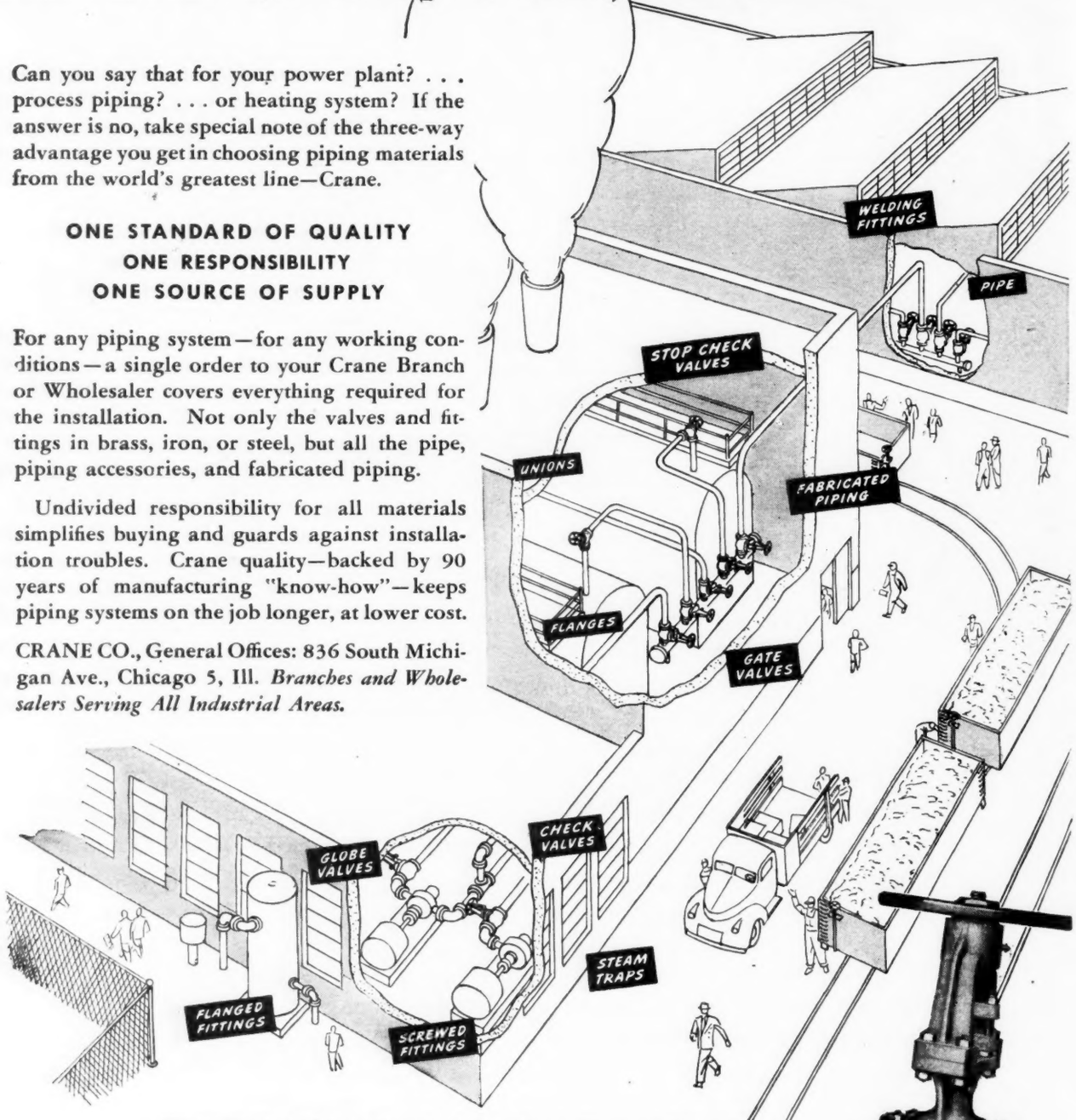
Can you say that for your power plant? . . . process piping? . . . or heating system? If the answer is no, take special note of the three-way advantage you get in choosing piping materials from the world's greatest line—Crane.

ONE STANDARD OF QUALITY
ONE RESPONSIBILITY
ONE SOURCE OF SUPPLY

For any piping system—for any working conditions—a single order to your Crane Branch or Wholesaler covers everything required for the installation. Not only the valves and fittings in brass, iron, or steel, but all the pipe, piping accessories, and fabricated piping.

Undivided responsibility for all materials simplifies buying and guards against installation troubles. Crane quality—backed by 90 years of manufacturing "know-how"—keeps piping systems on the job longer, at lower cost.

CRANE CO., General Offices: 836 South Michigan Ave., Chicago 5, Ill. *Branches and Wholesalers Serving All Industrial Areas.*



(*Right*) Typical of the uniformly high quality in Crane products—Crane Alloy Steel Wedge Gate Valves. The 600-pound class, with Exelloy to No. 49 Nickel Alloy seating, is recommended for steam, water, gas or air up to 850° F. maximum; with Stellite to Stellite, for steam up to 1000° F.; with Exelloy to Exelloy, for oil or oil vapor up to 1100° F. Screwed, flanged, or welding ends. See your Crane Catalog for complete specifications.

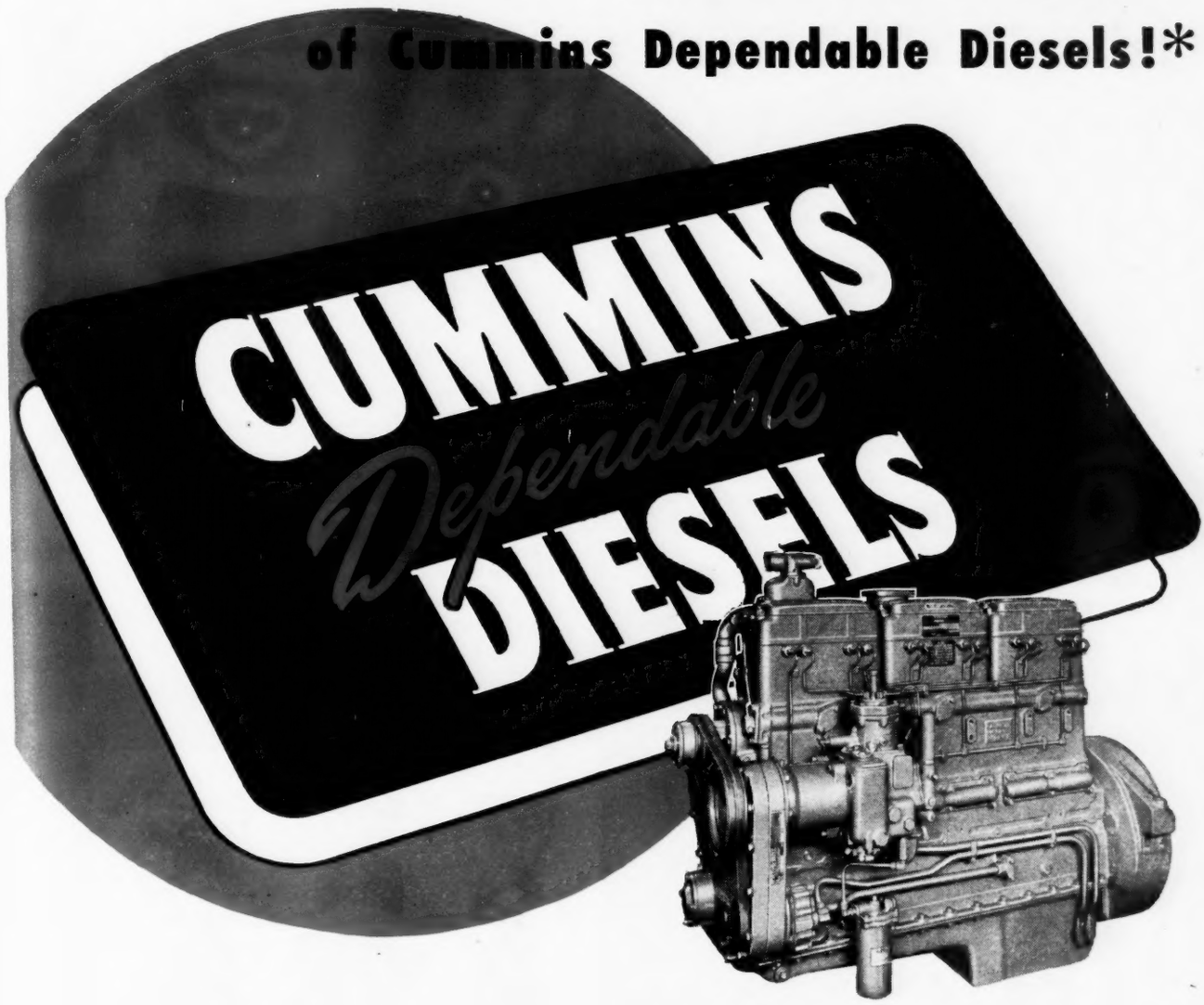
EVERYTHING FROM . . .

VALVES • FITTINGS
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CRANE

FOR EVERY PIPING SYSTEM

Proved dependable . . . in every job . . . in pit and shaft. For faster, cheaper tonnage, you can't beat the proved performance record of Cummins Dependable Diesels!*



**The Facts:* On many of the largest operations—above ground and below—Cummins Diesels have long been standard power . . . a choice backed by 13 years of proved performance. No fewer than 54 of the nation's first-ranking builders of material handling and earth moving equipment today offer Cummins Diesels as standard or optional original power. For *every* heavy-duty mining job—stripping, loading, hauling or power generation—there is a proved-on-that-job Cummins Dependable Diesel . . . rated 150-200-275 hp (maximum).

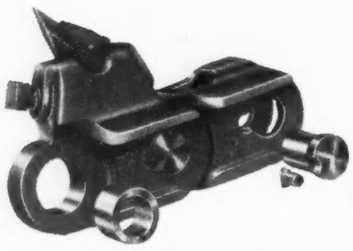
CUMMINS ENGINE COMPANY, INC., COLUMBUS, INDIANA

get more$$$ from that MINE of yours!



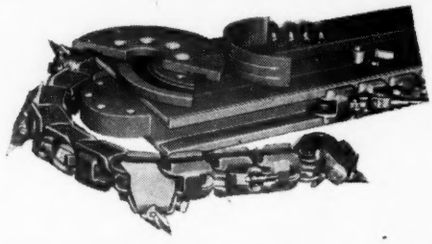
BITS by BOWDIL

Bowdil Bits will cut your coal faster and easier. Heat-treated steel bars are rolled with concave faces, giving the finished bit 25% more wearing length with exceptional savings in power and time. Tests and actual use in hundreds of mines have proved that Bowdil Bits will last 15% to 20% longer.



FABRI-FORGE CHAIN

Lower your operating costs by relying on a Bowdil Fabri-Forged Chain. Bowdil design eliminates troublesome features; produces a chain that is rugged, yet easy to maintain. The drop-forge lug body stands up under heavy wear, for breakage is practically eliminated. The true-running radial track guide is a major improvement.



THE BETTER CUTTER BAR

Bowdil Cutter Bars are specially designed to meet present-day demands for extra strength and power saving. Rivet free body, Z bar construction of wide wearing strips result in sturdiest bar used in mining today. Bowdil cutter bars are standardized to fit all coal cutting machines.



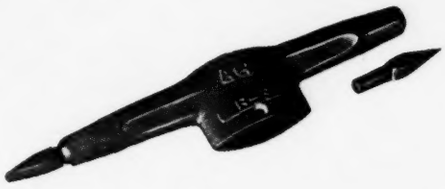
ALLOY STEEL AUGERS AND DRILL BITS

There is no "grabbing" tendency with Bowdil augers and drill bits. Uniform temper and shape, achieved by extensive research, eliminate almost all possibility of "grabbing". The use of special heat-treated alloy steels not only makes Bowdil last longer, but adds an important safety factor.



CUT ANYTHING WITH BOWDIL BITS

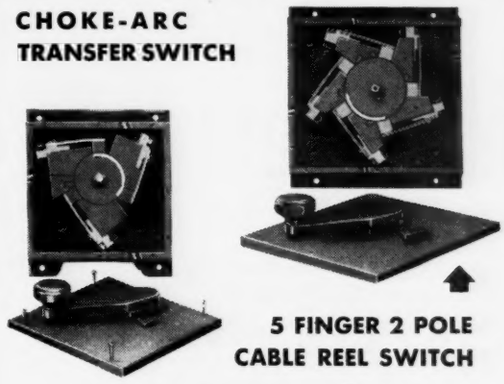
Whatever your bit requirements are, Bowdil can supply them. Fish-tail auger bits, four-point auger bits and two-point clay bits are available in a number of different sizes. They are all made of Bowdil's specially treated steel for long and efficient service.



REPLACEABLE POINT
MINER'S PICK

You can carry an "extra" pick in your pocket! With a Bowdil Miner's Pick, it only takes a few seconds to replace a dull, blunted point with a sharp one. Light or heavy, Bowdil pick heads are perfectly designed for weight and balance.

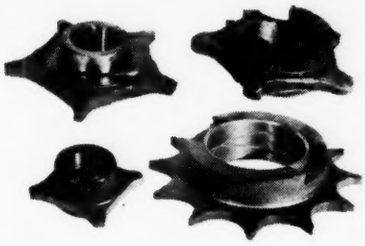
CHOKE-ARC TRANSFER SWITCH



5 FINGER 2 POLE CABLE REEL SWITCH

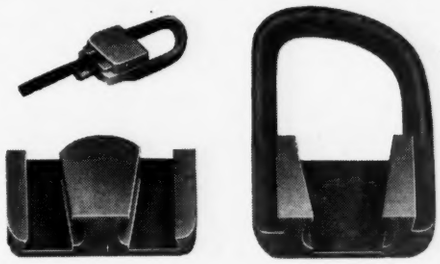
Safety is all-important in mines. A Bowdil Switch enables you to cut power immediately in case of a breakdown in the electrical system. The choke blade, made of extremely high-resistance material, cuts the arc instantly when the switch is thrown under power.

FOR ALL MAKES OF MACHINES



SPROCKETS

Exceptionally long service can be expected from all Bowdil Sprockets, for they are made from special heat-treated alloy steel and designed for hard wear. A stock of over 100 different styles includes clutch type, spline type, keyed type and various tooth designs of from 4 to 13 teeth.



NEW, FAST ROPE SOCKET

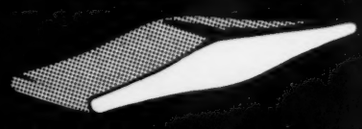
You can save time with a Bowdil Rope Socket, because it takes just two minutes to install one . . . and no tools are necessary. The high-tensile steel and improved design give maximum strength.

DETACHABLE JAW SPIKE PULLER

There's no use losing time with inefficient spike pullers. A Bowdil Spike Puller pays for itself many times over. Detachable jaws make it possible to replace claws without delay. The special construction pulls spikes without bending them. Bowdil Spike-Pullers are small, easy to handle.



ALL PRODUCTS OF THE BOWDIL COMPANY



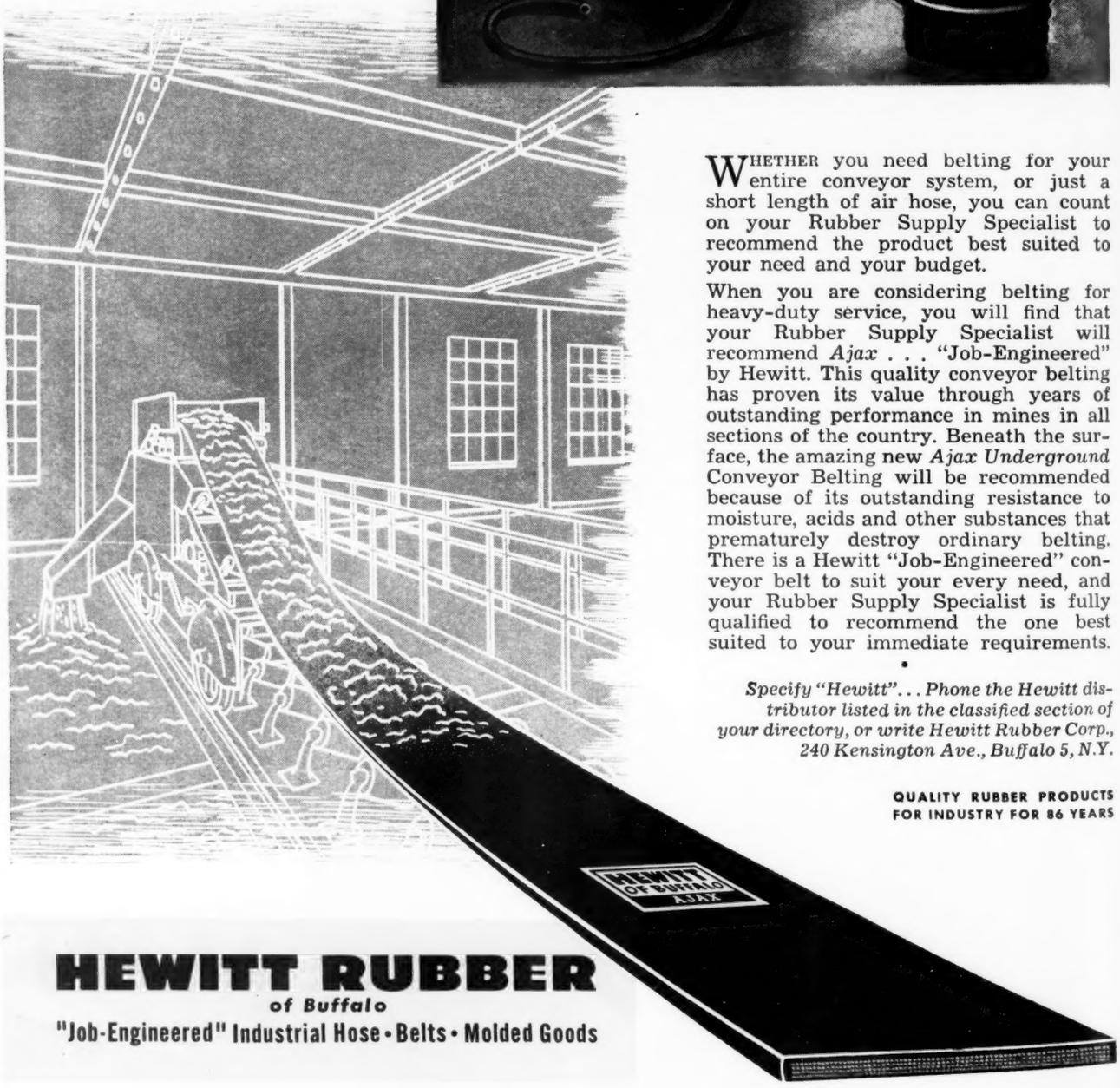
CANTON, OHIO

Mammoth or Midget

Whatever Your Need

YOU CAN COUNT ON YOUR RUBBER SUPPLY SPECIALIST





WHETHER you need belting for your entire conveyor system, or just a short length of air hose, you can count on your Rubber Supply Specialist to recommend the product best suited to your need and your budget.

When you are considering belting for heavy-duty service, you will find that your Rubber Supply Specialist will recommend *Ajax* . . . "Job-Engineered" by Hewitt. This quality conveyor belting has proven its value through years of outstanding performance in mines in all sections of the country. Beneath the surface, the amazing new *Ajax Underground* Conveyor Belting will be recommended because of its outstanding resistance to moisture, acids and other substances that prematurely destroy ordinary belting. There is a Hewitt "Job-Engineered" conveyor belt to suit your every need, and your Rubber Supply Specialist is fully qualified to recommend the one best suited to your immediate requirements.

•

Specify "Hewitt"... Phone the Hewitt distributor listed in the classified section of your directory, or write Hewitt Rubber Corp., 240 Kensington Ave., Buffalo 5, N.Y.

QUALITY RUBBER PRODUCTS FOR INDUSTRY FOR 86 YEARS

HEWITT RUBBER

of Buffalo

"Job-Engineered" Industrial Hose • Belts • Molded Goods



Who's Your Friend?

IT'S coming—the coal-burning house heater that runs itself and makes house-heating with COAL more economical than ever. The robot friend of every householder and coal man.

This equipment is expected not only to cost less to run, but less to buy. Its development is a triumph of cooperative research.

Research results of this calibre are of enormous importance to coal producers, dealers and carriers. That is why the Chesapeake and Ohio Railway participates in every major bituminous coal research program.

The past winter brought difficulties, but next winter should be easier. World coal supply will doubtless be more nearly normal. Here at home, new COAL-burning equipment for automatic house-heating should be in supply, adding new competitive strength to the industry.

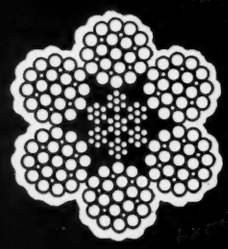
The Chesapeake and Ohio is proud to be associated with COAL, sees great opportunity ahead for COAL, believes in the efficiency and economy of COAL for hauling its freight and passenger trains.

When you ship via Chesapeake and Ohio you know your coal is being hauled exclusively by COAL-burning locomotives.

THE CHESAPEAKE AND OHIO RAILWAY

"The 100% Coal Railroad"

Best for Heavy Hoisting



UPSON-WALTON
6 x 19 FILLER WIRE CABLE



FOR boom falls on shovels and draglines, for operating ropes on vertical lift bridges, for pan hoist and counterweight ropes on car dumpers—industry after industry has heavy hoisting conditions which are best served by Upson-Walton 6 x 19 Filler Wire Perfection Layrite.

Perfection grade because this improved plow steel is the strongest and toughest and most resistant to wear of all the grades of wire used to make rope.

Layrite because this fine *pre*formed wire rope results in longer life, greater safety, greater economy.

Hemp center or, where hoisting conditions are extremely severe, IWRC (independent wire rope center)

Upson-Walton, 6 x 19 Filler Wire cable is the wire rope which provides a fine balance between coarser ropes, which have good abrasion resistance but poor flexibility, and flexible ropes with less abrasion resistance. *Upson-Walton 6 x 19 Filler Wire cable combines good flexibility with good abrasion resistance.*

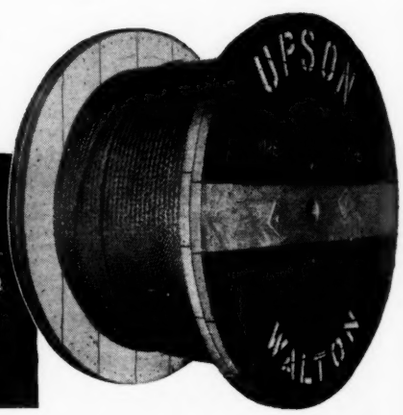
The filler wires support uniform outer wires, thereby giving the rope a greater resistance to crushing and other damage where radial pressures and operating conditions are severe. This construction provides a high percentage of reserve or internal strength.

U-W

Established 1871

It will pay you to specify (and supply) Upson-Walton 6 x 19 Filler Wire cable—perfection grade—Layrite preformed —for heavy hoisting duty.

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THE UPSON-WALTON COMPANY

Manufacturers of Wire Rope, Wire Rope Fittings, Tackle Blocks

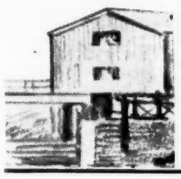
MAIN OFFICES AND FACTORY: CLEVELAND 13, OHIO

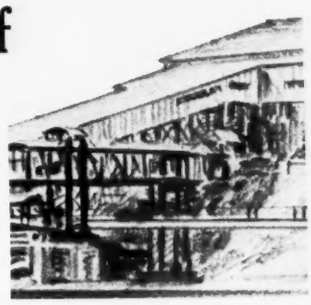
114 Broad Street, New York 4 · 737 West Jackson Boulevard, Chicago 6 · 241 Oliver Building, Pittsburgh 22

Why Such Tremendous Sums are Being Spent for

MODERNIZATION

51 Coal Companies Plan 1946 Outlays of *250 Thousand to 2 Million Dollars Each* for New Equipment!





As reported to Coal Age, October 1945, by companies representing 22% of total U. S. coal production.

THESE EXPENDITURES will replace worn out and obsolete equipment with *modern, mechanized equipment*, reduce manpower, cut costs, and speed production—in a large number of mines.

A Competition Advantage

Mechanization *above* ground at these mines will raise product value by producing *clean* coals, of low impurity content, correct sizing and uniformity—the kind of coals that win the better markets—the highest prices.

For a large percentage of all modern mechanized mines, Morrow Tipples are, and will continue to be, specified. Because Morrow *streamlines* production from mine to cars or barges in shorter time, at lower cost—in the best condition to SELL!

Morrow engineers are available now to design and equip more efficient preparation plants. Ask Morrow to assign an engineer to study your situation. Write The Morrow Manufacturing Company, 1940 Ford Blvd., Wellston, Ohio. *Division The Wacker Corporation.*

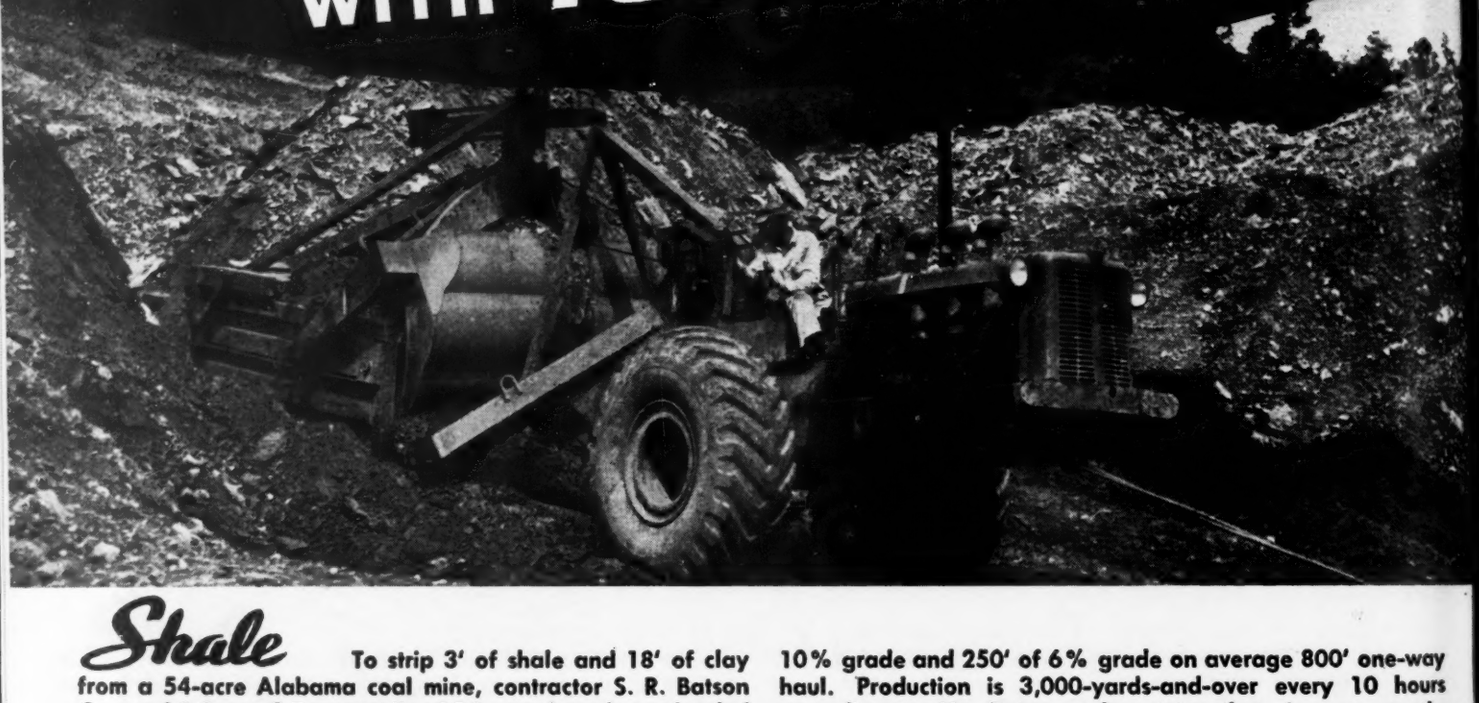
Better Preparation
=INCREASED SALES!

1. low impurity content
2. correct sizing
3. high uniformity

MECHANIZE WITH MORROW

COAL WASHERS • WEIGH PANS • FEEDERS • DUMPS
BINS AND BIN GATES • FLANGED LIP SCREENS
CONVEYORS • LOADING BOOMS • SHAKING SCREENS
VIBRATING SCREENS • CAR HAULS • PICKING TABLES
SETTLING TANKS • ELEVATORS • CAR RETARDERS
PERFORATED METAL SCREENS • STEEL STRUCTURES

YOU CAN PROFITABLY HANDLE *All these materials* WITH TOURNAPULLS



Shale To strip 3' of shale and 18' of clay from a 54-acre Alabama coal mine, contractor S. R. Batson Co. used 2 Super C Tournapulls. 15 heaped yards are loaded in 75 to 85 feet in one minute. Tournapulls travel up 150' of 10% grade and 250' of 6% grade on average 800' one-way haul. Production is 3,000-yards-and-over every 10 hours according to Mr. Batson, who states that, in two months of operation, they have had only two hours down time.



Mud 3 Tournapulls moved mud during "shut-down" nditions for Grantwood Const. Co. on 110,000-cu. yd. land veling job near St. Louis, Mo. Springs seeping out of hillside pt water standing in the cut. Fill was placed in a swamp. ournapulls kept working because their big 21.00 x 24 tires ave ample flotation to stay on top of soft ground; correct atio of weight to h.p., plus 2-wheel prime mover design, gave lenty of traction and power.



Rooted Rock 5 Tournapulls loaded tight, rocky hardpan for Leonard & Slate on 2½-mile, 636,000 yard section of U.S. 99 north of Woodland, Wash. Each rig averaged 55 pay yards per hour on a 4600' round trip haul over 18 to 20% return grades, plus delays entering heavy traffic stream for haul on main highway. Tournapulls handle broken shale, decomposed granite, crushed stone, hardpan or any material a Rooter can break loose.



Gravel Raemisch-Madden Co. used part of their fleet of 11 Tournapulls to load, haul and spread 47,000 cu. yds. of sub-base on U.S. 66, near Chenoa, Ill. Loading wet, pit-run gravel, hauling over pavement, spreading 4 to 6" lifts under rigid state engineer inspection, each rig delivered 25 pay yards per hour on 6-mile round trip. This method eliminated conventional shovel loading, truck hauling and spreader boxes.



Clay Working in typical Iowa gumbo, Peter Kiewit Sons Co. used 6 Tournapulls on their 2,300,000-yd. Rock Island rail relocation job, near Eldon, Iowa. Loading soft, sticky clay out of a 22' cut, material was spread on an 18' fill at bottom of a steep, slick grade. High apron lift, plus positive ejection tailgate cleared each load from the Carryall bowl; big-tired, 2-wheel traction gave plenty of pull through the soft fill and up slippery grade.

Sand "Nothing like Tournapulls to move this sand," says J. M. Jones, Sup't. of Claussen-Dunn Const. Co. on their 300,000-yd., 3-mile Georgia highway job. Material is loose, dead sand. Two Tournapulls pumped capacity loads up to the spring pipe in 2½ minutes; each rig averaged a 9000' round trip every 10 minutes, with travel through 7,800' of traffic on black-top. Rain kept other haul units out of pit for two days, didn't stop Tournapulls.

Investigate Tournapull profit possibilities on YOUR dirt-moving. Get cost and production estimates from your LeTourneau Distributor!



LETOURNEAU
PEORIA, ILLINOIS • STOCKTON, CALIFORNIA

JOB-PROVED
Over 4100 Built and Shipped

TOURNAPULLS*

* Trade Mark Reg. U.S. Pat. Off.

FOR LOWEST NET COST PER YARD

"Just What the Doctor Ordered"

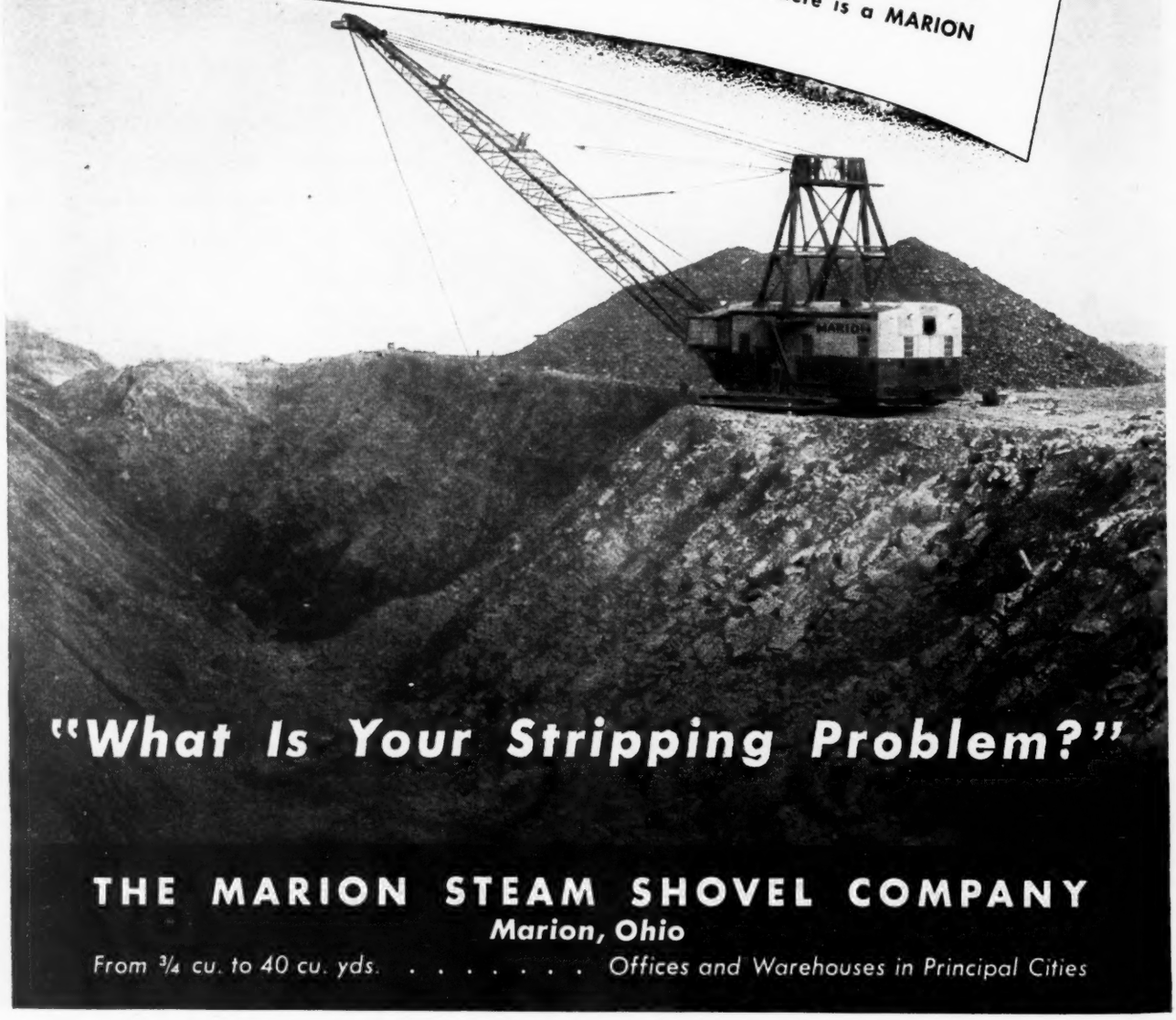
for J. Robert Bazley, Inc., Pottsville, Pa.



MARION

℞ **TYPE 7400 WALKING DRAGLINE with 175 FT. BOOM AND 10 CU. YD. BUCKET**

To dig over 100 ft. of hard rock overburden and recover a 25 to 35 ft. vein of anthracite coal with a single machine. Your stripping problem may be different. There is a MARION to solve it.



"What Is Your Stripping Problem?"

THE MARION STEAM SHOVEL COMPANY

Marion, Ohio

From ¾ cu. to 40 cu. yds. . . . . Offices and Warehouses in Principal Cities



TOUGH LOADS . . . RIGHT ANGLE FEED . . .

LICKED BY BWH CONVEYOR BELT!

Far below ground, a BWH Conveyor Belt, under extremely difficult conditions, licked the problems posed by this Pennsylvania Coal mining operation. Used as a "gathering conveyor," it picked up the discharge from other room conveyors and brought the coal to the cars. This operation involved tandem drive, right angle feed, and uneven distribution of load. Yet this belt . . . produced by the exclusive BWH ROTOCURE process of continuous vulcanization . . . did the job, and did it well!

This "know how" in producing conveyor belts of extraordinary toughness is one reason why BWH is known throughout industry for its achievements in producing industrial rubber goods of dependable ruggedness. Perhaps you've a problem we can solve for you.

HAVE YOU A JOB WHERE STAMINA COUNTS?

Bring us your toughest problems . . . we're specialists in solving them. Consult your nearest BWH distributor, or write to BWH direct.



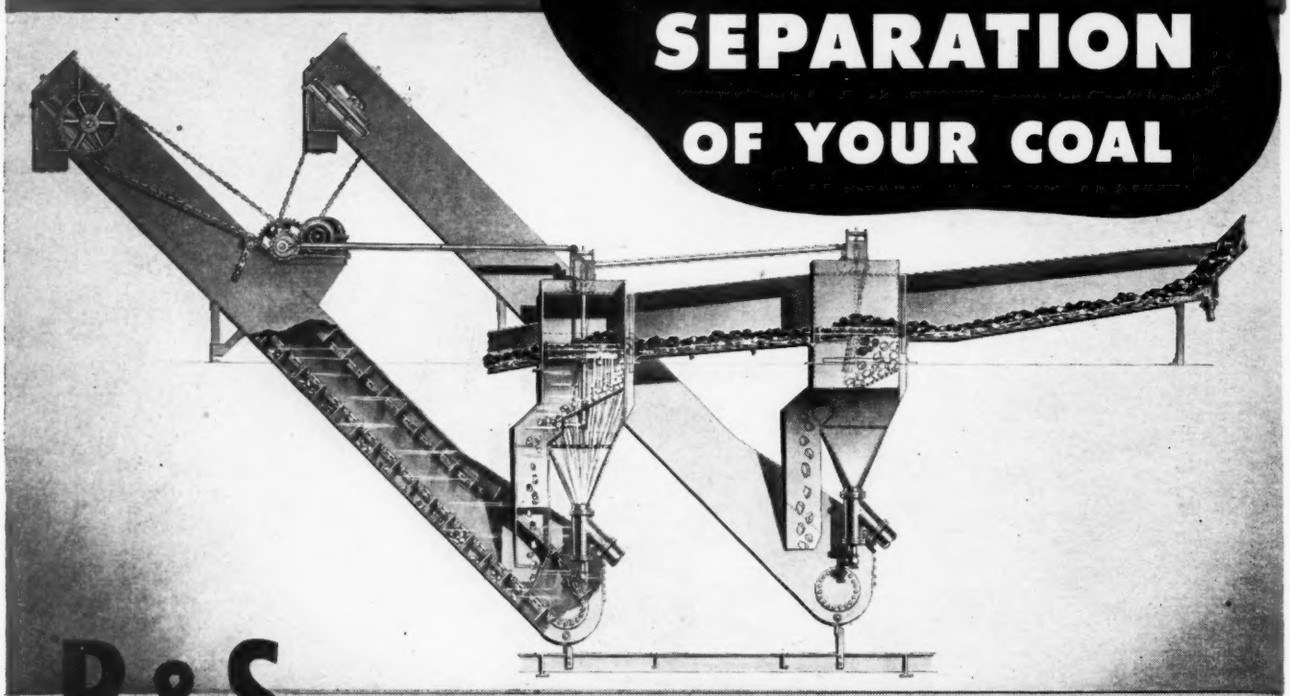
BOSTON WOVEN HOSE & RUBBER COMPANY

Distributors in All Principal Cities

WORKS: CAMBRIDGE, MASS., U. S. A. • P. O. BOX 1071, BOSTON 3, MASS.

Continuous . . . *Clean*

SEPARATION OF YOUR COAL

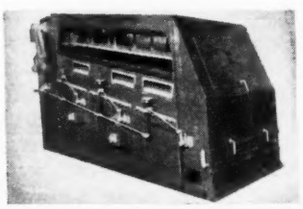


R&S TANDEM HYDRO-SEPARATOR

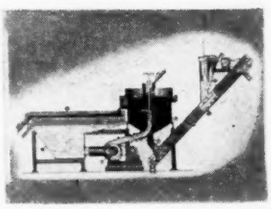
Windsor Power House Coal Co., Wellsburg, West Virginia, prepares coal for power plant use with R & S Hydro-Separators, pictured above. Mine run coal is crushed and screened. Large sizes are washed in Hydro-Separators. Small sizes are bypassed. Larger sizes are recrushed and mixed with the smaller sizes for delivery to power plant. The capacity of the Windsor plant is 450 tons of coal per hour.

R & S Tandem Hydro-Separators operate on a principle that assures automatic, fool-proof production of clean coal—a big statement that can be proved by many installations. R & S Hydro-Separators turn out a constant flow of uniform, high grade fuel. One operator controls the whole operation. Clean coal flows continuously through the Hydro-Separator cells with controlled water currents to effect the separation of refuse.

Write for bulletin No. 161 for full information.



Dry cleaning coal with air is efficient and economical in the R & S Stump Air Flow Cleaner. Ask for Bulletin No. 163.



R & S Hydrotators for fine coal washing are also automatic, efficient, and economical. Bulletin No. 162 gives a complete story.

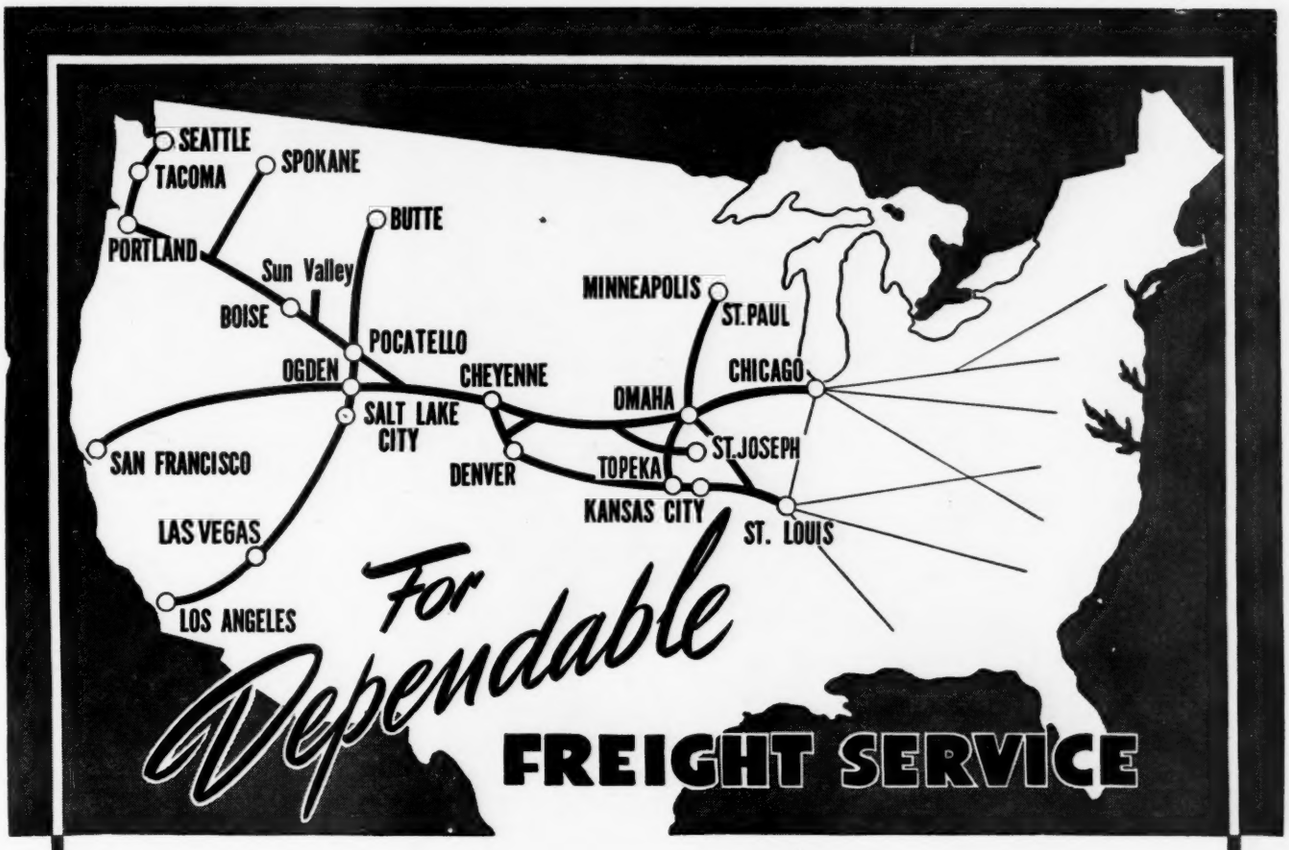
R AND S COMPANY

ROBERTS and SCHAEFER CO.

307 North Michigan Avenue, Chicago

2221 Oliver Building
PITTSBURGH, 21, PA.

P. O. Box 570
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FOR ALL SHIPPERS—the Union Pacific Railroad provides . . .

A Strategic Middle Route that unites the East with the Mid-West, Intermountain and all Pacific Coast states.

Modern operating facilities, equipment and motive power include the famous "Big Boys," super-powered locomotives for fast hauling of heavy freight loads over mountain grades.

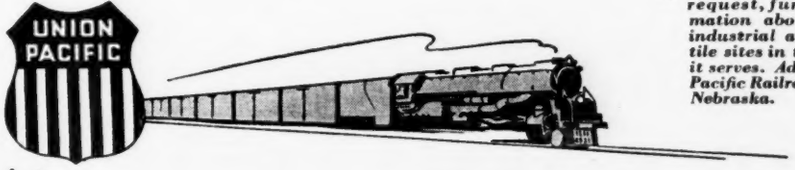
Union Pacific also has long been renowned for its well-ballasted steel highway, specially constructed for smooth, safe operation of freight traffic at high speed.

General agency offices are located in metropolitan cities, coast to coast, with a staff of experienced traffic men trained to assist you and other shippers in effectively meeting your transportation problems.

For dependable, on-the-job freight service—

Be Specific—say "Union Pacific"

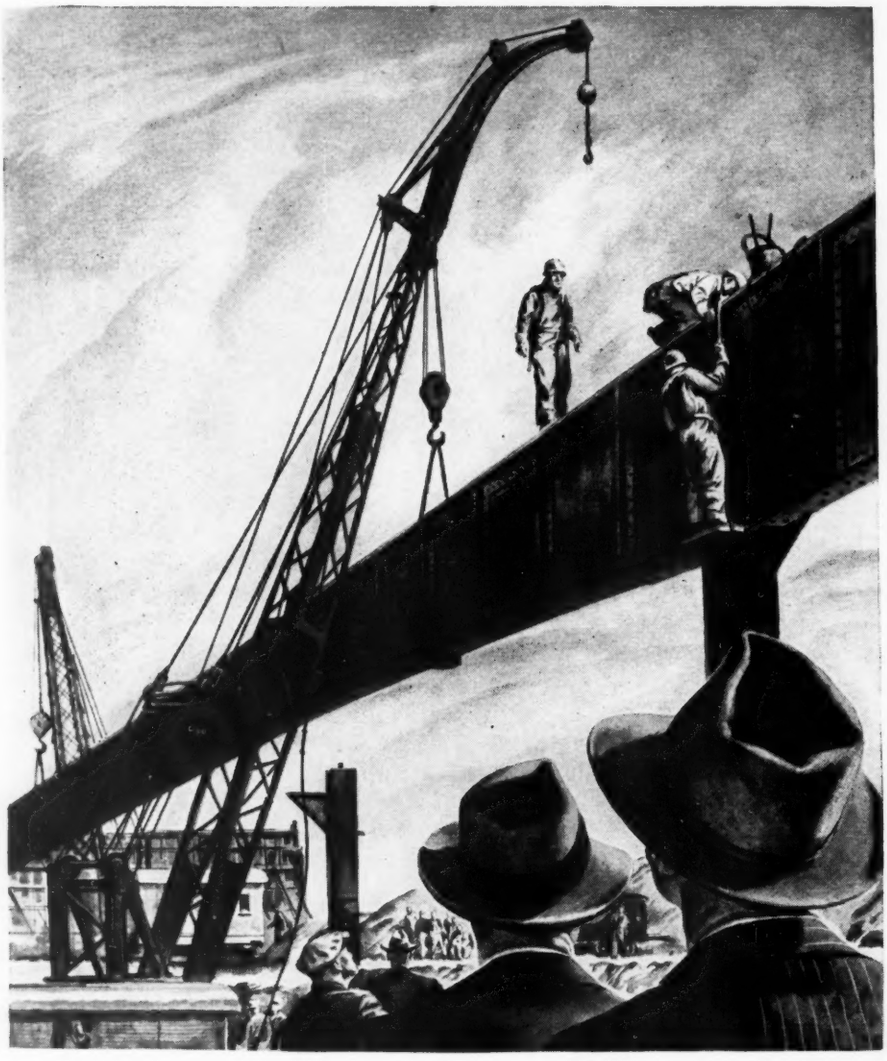
★ *Union Pacific will, upon request, furnish information about available industrial and mercantile sites in the territory it serves. Address Union Pacific Railroad, Omaha, Nebraska.*



The Progressive

UNION PACIFIC RAILROAD

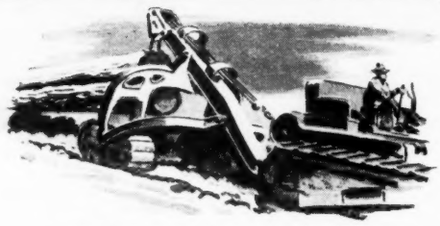
The Strategic Middle Route



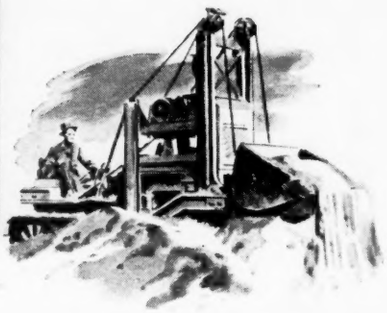
If you're a "Sidewalk Superintendent"

-watch the wire rope

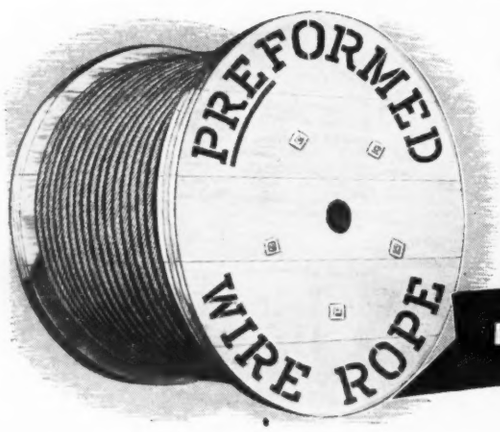
Here's a show that scores a hit wherever it plays—building erection. These big cranes pick up steel girders and mesh them into place like the gears in your car. The star in the cab does it with levers and Preformed wire rope.



Logging machinery moves dead-weight logs with wire rope providing the sinews. Preformed wire rope gets top billing because it handles easier, resists kinking and stands the gaff.



Earth moving has come a long way since the day of the pick, shovel and wheelbarrow. Now bulldozers, shovels and trench hoes make the dirt fly—and their moving parts are actuated by wire rope, Preformed preferred.



On jobs like these and hundreds of others the new wire rope —Preformed—is breaking old performance records. Operators like it because it's safer and handles easier. The office likes it because it lasts longer and reduces time lost for replacement. It makes money by saving money.

ASK YOUR OWN WIRE ROPE MANUFACTURER OR DISTRIBUTOR

IT HANDLES EASIER—LASTS LONGER

PMCO

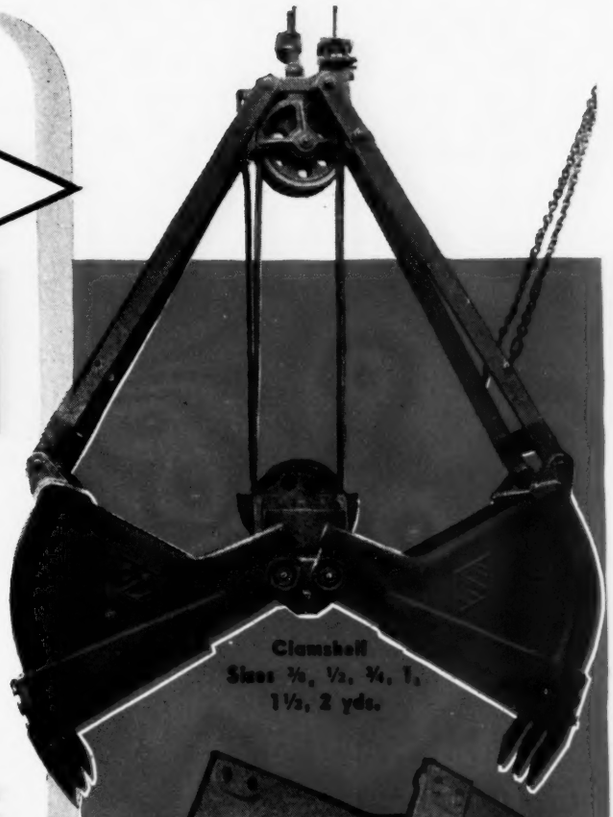
America's Most Complete Line of Material Handling Buckets

All purpose -

- SHOVEL
- PULLSHOVEL
- DRAGLINE
- CLAMSHELL

• FRONTS, BOTTOMS, SCOOPS and TEETH shown in red on buckets are 14% manganese steel developing tensile strength up to 120,000 p.s.i. This high percentage manganese steel gives tough, rugged strength for hard service and allows wide set corner teeth for easy entrance in digging. Volume production methods enable us to build a better bucket with amazing economies in manufacturing.

On the ½ yd. and ¾ yd. Shovel, Pullshovel, and Dragline Buckets, all teeth are interchangeable — a great advantage to operators.



Clamshell
Sizes ⅜, ½, ¾, 1, 1½, 2 yds.



Pullshovel
Sizes ⅜, ½ and ¾ yd.

Experience Counts

See your shovel man or equipment dealer about PMCO Buckets and Dippers.



Dragline
Sizes ⅜, ½, ¾, 1, 1½, 2, 2½ yds.

Shovel
Sizes ⅜ to 18 yds.

"Quality Since 1880"

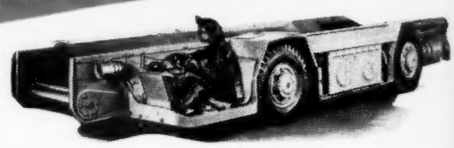
PETTIBONE MULLIKEN CORP. CHICAGO 51, U. S. A.

WE OPERATE THE LARGEST AND MOST COMPLETE MANGANESE STEEL FOUNDRY IN THE UNITED STATES.

and now—

HYDRAULIC STEERING for JOY Shuttle Cars

EASIER OPERATION SHORTER TURNS



4 WHEEL HYDRAULIC STEERING

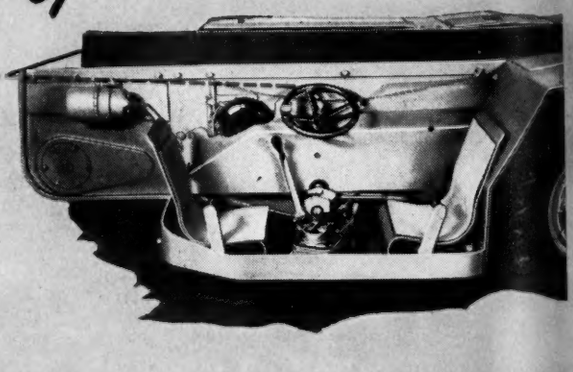
All four wheels turn in this sensational new Joy Shuttle Car, acclaimed by engineers as a crowning achievement in mine haulage engineering. Turns the sharpest corners with half the effort . . . smoothly, easily by a one-handed twist of the steering wheel. Hydraulic steering reduces driver fatigue!

4 WHEEL DRIVE

Better performance, more tractive effort with shorter turning radius is the big feature of the Joy 4 wheel drive. Adapted from the four-wheel military vehicles, this simplified wheel articulation design has been thoroughly proved in Army Trucks and Heavy Duty Distribution Units under heaviest military loads.

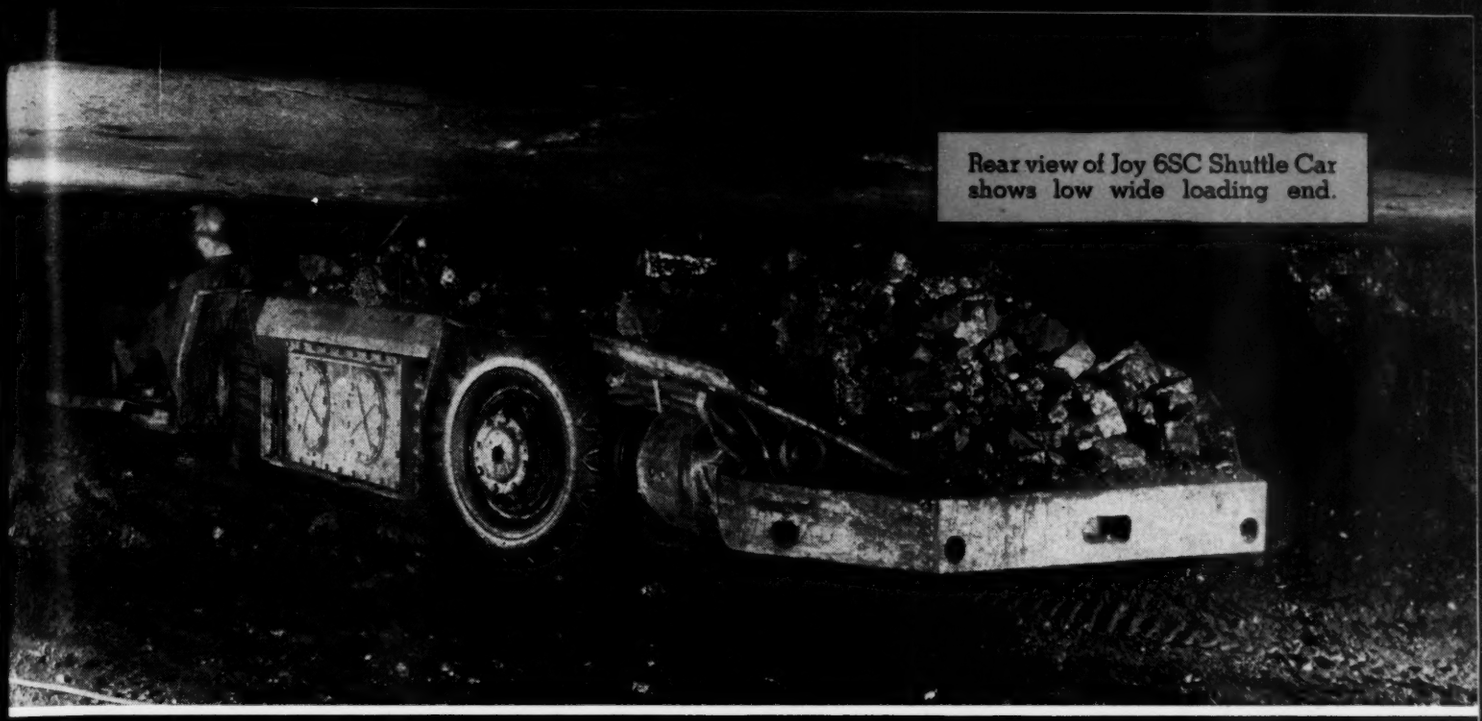


Joy Engineering Provides Greater Comfort for Operator

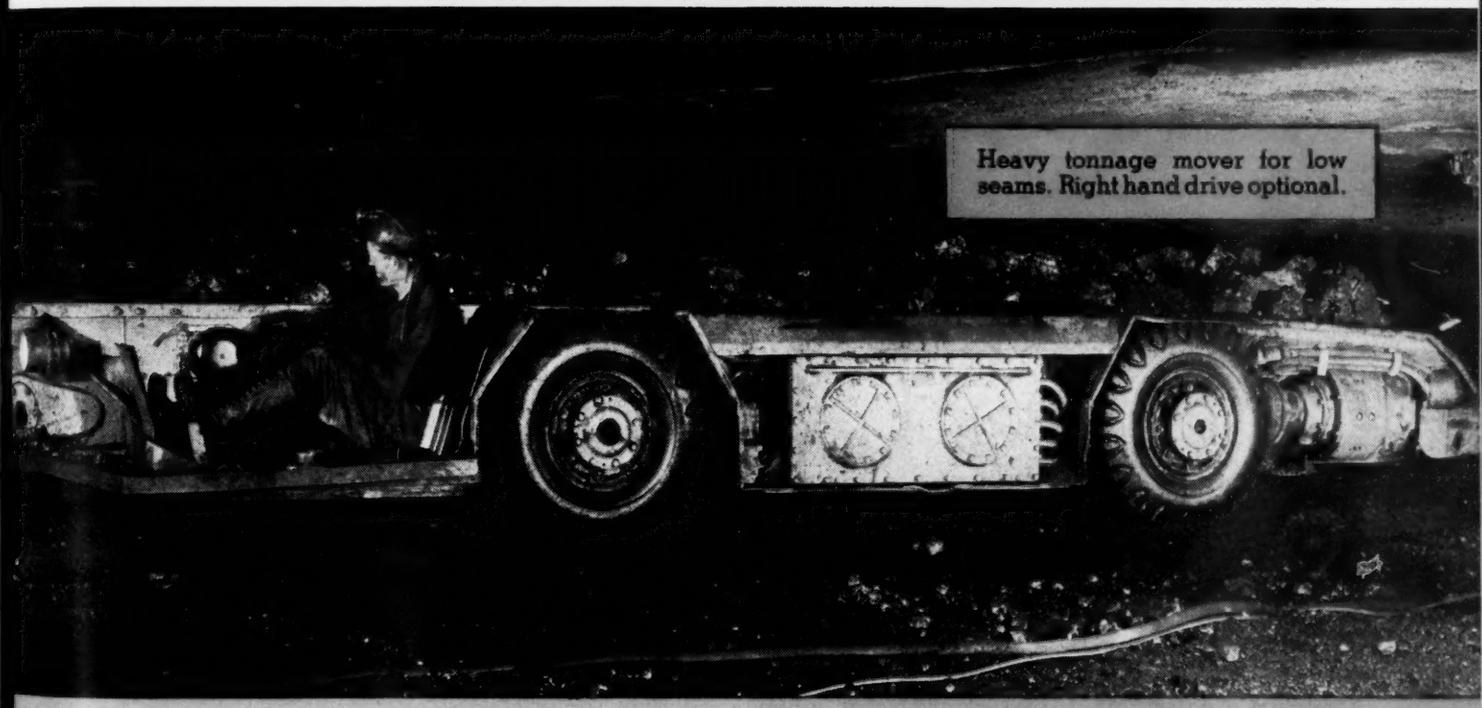


The smaller steering wheel, located at the right of the driver, permits greater leg room. Spring steel seats, with foam rubber cushions add further to comfort.

JOY Manufacturing Co.



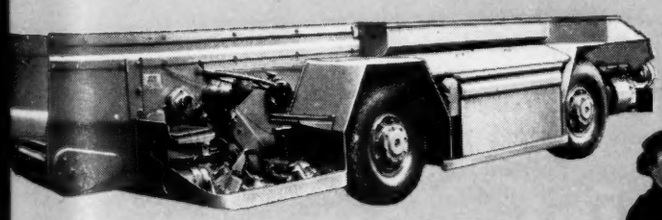
Rear view of Joy 6SC Shuttle Car shows low wide loading end.



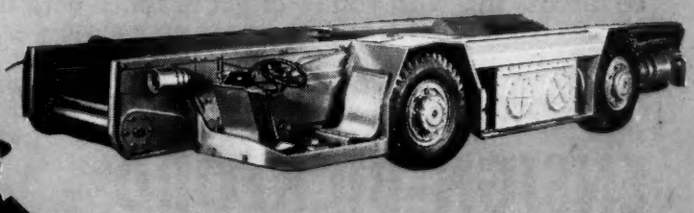
Heavy tonnage mover for low seams. Right hand drive optional.

AVAILABLE IN TWO JOY MODELS

5SC (42" high) and 6SC (31" high)



Eight foot wheel base; manual or hydraulic drive; battery or cable reel; high elevated discharge end optional.



Cable reel only; fixed discharge, low or high; sideboards can be added; capacity three tons.



Call in a Joy Engineer—

FRANKLIN, PA.



The Fuse That Wears A Raincoat

Designed particularly for very wet work, the Black Wax Charter Oak finish adds to its waterproof qualities. The soft, yielding black wax finish also fills in closely around the cap crimp, insuring a satisfactory watertight joint when a circular (or cut-throat) crimp is used.

Perhaps Black Wax Charter Oak Brand is the answer to some of your blasting problems. Your Explosives Company will be glad to discuss this with you — or get in touch with us. S—24

ENSIGN-BICKFORD *Safety Fuse* **SINCE 1836**

Also Primacord-Bickford Detonating Fuse

THE ENSIGN-BICKFORD COMPANY • SIMSBURY, CONNECTICUT

"First in Fusing a Safer America"

Coal Age

DEVOTED TO THE OPERATING, TECHNICAL AND BUSINESS PROBLEMS OF THE COAL-MINING INDUSTRY

Ivan A. Given, *Editor*

MARCH, 1946

Not Lightly

THE *Federal Register* of Feb. 7 made official the intention of the Solid Fuels Administration for War to release shippers and users to make their own arrangements after March 31 and to wind up SFA activities June 30. It is cheering these days to hear that any federal agency is relaxing its controls, even though in this case the controlling organization is leaving the scene with high praise for a job well done. But it appears that a number of other federal agencies do not agree with SFA on getting out of the way of business. OPA, for example, comes to mind immediately, and its record, as well as the records of many other agencies, wartime and otherwise, are not calculated to inspire confidence in the contention that getting on the federal payroll automatically equips a man to think for all the people of the nation and get the right answers.

One question that might be asked once more in the light of recent experience is: "Does coal want to invite the federal government in again?" Perhaps a new coal act may be necessary, although there is good ground for believing that a little courage in selling would solve the problem. It still is true that the man who prices below cost cannot take all the business and can only go broke if other producers stand their ground. The market situation, also, promises to be good for some time. Thus, there is ample opportunity for exhaustive study of the problem. If coal should again request legislation, it should not be a step taken lightly but rather a decision reached only after all possible alternatives have been fully explored.

Still Necessary

FEW BUT dyed-in-the-wool New Dealers, starry-eyed believers in the altruism of radical labor leaders, business baiters, proponents of new economic theories, out-and-out seekers after votes on any basis, advocates of statism and Red-Fascist revolutionaries, their backers and their supporters can be getting much satisfaction out of some of the recent developments on the labor front. All too many of the strikes that have bedeviled the nation since the end of hostilities have had not legitimate but revolutionary ends. In other words, they are aimed at forcing a change in the American system and consequently have included intimidation, violence, transgression of civil liberties and defiance of federal, State and local law and authority.

So far, there is reason to believe that unions of that type are in the minority. However, many of them are spotted where they can work hardship far out of proportion to their membership, and certainly the New Deal has been laboring diligently to smooth their way and make it possible for them to get away with anything they want to attempt. Even now, that same New Deal is bending every effort to prevent the institution of any curbs on even the wildest, most radical and most revolutionary minded labor-union leadership. For that reason, there is not much hope that legislation repairing past mistakes will get through Congress or past a veto. The fact that such legislation had even to be considered dates back to the deal made by the Roosevelt administration to present union leaders with monopolies in return for votes—a deal whose outgrowth was the Wagner Act and subsequent legislation strengthening the monopolistic powers of these leaders, which powers they have proceeded to exercise to the fullest when it comes to exacting what they want and preventing any interference with their activities. Consequently, they are inviting the restrictions that reasonable conduct would render unnecessary. What the future will bring still is hidden from mortal sight, but it is to be hoped that the lessons to be learned from the present turmoil will lead to action really promoting the necessary cooperation between management and labor for the benefit of the nation.

Pound or Ton?

PRICE, OF COURSE, is the major factor in merchandising any product and there is no getting around it. But there is some reason to believe that the way price is stated may have considerable to do with consumer reaction. Fuel oil, for instance, sells by the gallon and a price of, say, 8c. leaves the impression that the purchaser is getting a bargain. But coal sells by the ton, and $10, for example, still is an important sum of money to many people, whereas they might not look so hard at ½c. a pound or 50c. a hundred, which also add up to $10. Perhaps it is time to examine the merits of a change in the method of pricing to consumers.

District Heating:

Real Answer to Competition?

WITH 10,000,000 new homes commonly cited as necessary in the United States in the next few years, the battle for the job of heating them—and supplying them with energy for cooking, hot water and air conditioning—is really on. Considering heating alone, these 10,000,000 dwelling units, if built, would represent, if average yearly consumption were 5 tons, an annual market of 50,000,000 tons. If the average were higher—as it might be—the annual tonnage would be correspondingly greater. Question No. 1, therefore, is: "How can coal best proceed to get this new business and also get back other business it has lost?"

Perhaps the answer to this question can be approached by examining the way the owner of one of these new homes thinks. He probably will take a look at not only first cost but also the cost of operation and maintenance in relation to what he gets. So, if coal will offer him his necessary domestic services and comforts at the lowest cost, that undoubtedly will be a major factor, although not necessarily the only one. In fact, there is weighty evidence that in many cases convenience, cleanliness and release from responsibility may be the controlling factors, with the owner often willing to take a penalty in the form of some additional expense if that is necessary to get them. If he could get them with coal for the same or even less expense, and was shown clearly that he could, there is little doubt what the choice would be.

It is true, despite the preceding statements, that cost will be the deciding factor with many householders for some time to come, and in this case the industry can discharge its obligations by keeping that cost as low as possible, providing higher quality and greater uniformity, reducing dust and other nuisances and helping foster the design and distribution of more efficient smokeless stoves and other burning equipment. For that other large and increasingly important class of domestic consumers, however, the watchword is "automatic," and "pushbutton" has an irresistible appeal.

Convenience Improved

The automatic stoker was a big step toward "pushbutton" heating, and its advantages have been increased by modern feeding and ash-handling equipment. The "Anthratube," developed by the anthracite industry, offers still additional advantages in size, efficiency and convenience in using hard coal and promises to be a potent weapon in the battle against oil and other competition. But with all these new units some delivery, storage, dirt, ash, attendance and maintenance problems remain, although sharply reduced, and thus continue to offer targets for oil and gas salesmen. This has been a major factor in the interest in projects for rendering a complete "heating service" to the user, thereby relieving him of all responsibility for the care and operation of his heating plant. Such plans have undoubted advantages and quite likely are scheduled for substantial growth in the near future.

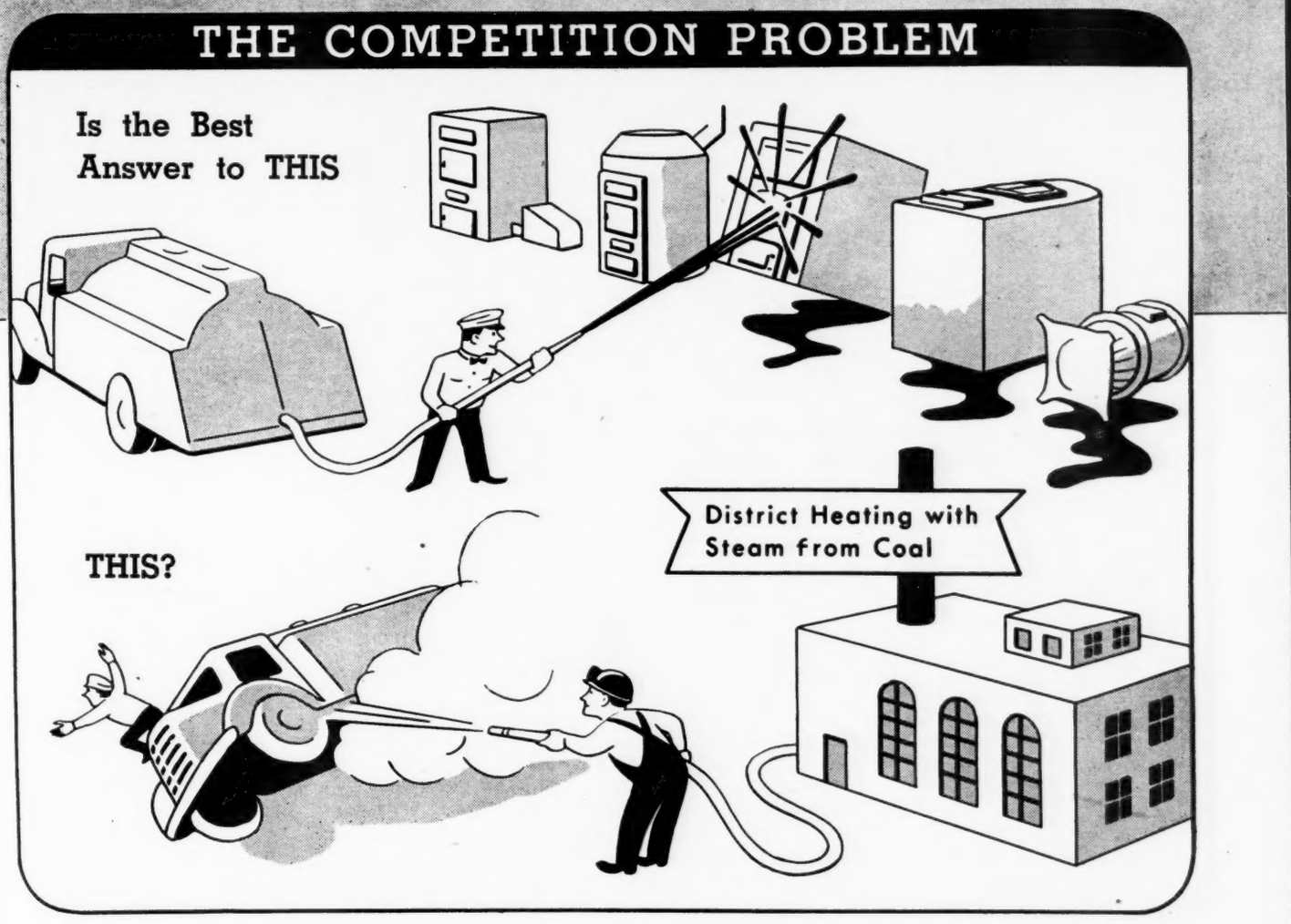
Everything indicates, however, that the definition of convenience is being broadened to where eventually—and perhaps soon—the "House of Tomorrow" will demand a heating system (and probably a cooling system) in which the householder not only is furnished "pushbutton" control but one that requires no plant or fuel storage on the premises. The accent will be on convenience at, naturally, low cost.

Electric heating is one possible approach, although equipment and cost still seem to be stumbling blocks. Electricity also can provide air conditioning, hot-water heating, cooking and refrigeration, plus light and power. Coal gas also can take care of heating, air conditioning, hot water, cooking and refrigeration. It is a promising field for investigation by the coal industry, and that investigation is going on (*Coal Age*, November, 1945, p. 83). It seems likely to result in a cheap, flexible gasification process in which case the use of coal gas, which provides the householder with more convenience than oil, in addition to taking care of jobs oil cannot handle, should be in line for a substantial increase.

Automatic equipment, heating service, electricity and gasification, however, by no means exhaust the possibilities of serving the householder with a maximum of convenience and a minimum of cost. Community steam plants, which also supply hot water and have definite responsibilities in cooking and air conditioning, are showing more and more of a disposition to move into the No. 1 spot in that respect. They provide truly "pushbutton" heating service, eliminate individual heating plants, with their accompanying delivery, storage, and operating responsibilities, and re-

How can coal meet tougher-than-ever competition in the vital domestic market?

Low cost, high quality and automatic equipment are present weapons. More gasification and heating service are future possibilities. But district heating, proved by experience, apparently offers the most in convenience, smoke elimination and economy.



duce air pollution and fire hazards. Generally, with his "pushbutton" service the consumer gets a cost advantage as well and naturally, since oil and natural gas have little or no chance to compete, they are knocked permanently out of the picture.

District or central heating, as it is commonly known, is old in principle although it is moving into new fields and types of application. Every apartment house with a furnace in the cellar is in effect an example of district or community heating. But in its usual sense, according to Roger D. DeWolf, consulting engineer of Rochester, N. Y., district heating was inaugurated in the United States at Lockport, N. Y., in 1877 by Birdsell Holley. The American District Steam Co., North Tonawanda, N. Y., developed from that modest beginning, while the combination of district heating with the generation of electricity started the Lockport Light, Heat & Power Co. on its long and useful career.

Although New York City, followed by Indianapolis, Ind., are the largest users of steam from central plants, Virginia, Minn., is credited with being the first community of its size (13,000) in the country to be served completely from a central plant. Winters are long and hard on the Iron Range, but a recent report has it that the average occupant of a five-room house in Virginia, Minn., pays $70 a year for heat and hot water, or about half what it would cost if he had his own heating system.

District Heating Now in Use

The exact number of district heating projects in operation is not known, but a recent report indicated that utilities were supplying service in 75 cities in addition to quite a number of municipally owned and operated plants, particularly in Minnesota, the leading State in number of installations. Those reported to be considering new plants include Terre Haute, Ind., which would thereby join such other communities as Watertown, S. D.; New Hampton, Iowa; Lansing, Mich.; Cleveland, Ohio; and Arcade, N. Y., plus numerous educational institutions, hospitals and federal, State, municipal and private housing developments.

The possibilities in district heating are being studied by several coal companies and by the Battelle Memorial Institute for Bituminous Coal Research, Inc. An association, the National District Heating Association, has been active in the field for many years.

Authorities in the field are of the opinion that central heating plants are practicable for very small projects and also for very large—30,000 people and up. In the Boston area, for example, one development consists of 28 dwellings of six rooms, bath, recreation and laundry quarters, powder room and attached garage in 14 units, to be serviced by a plant costing $16,000, including stoker and piping. Based on 6,000-deg. days, an 80-deg. design temperature, 8-percent-ash coal with $1.50 per ton allowed for removal and a consumption of 357 tons annually at $10 per ton, cost per family per month estimated at $10 to $11. Oil also is involved in a few cases, such as the El Reno project, Reno, Nev., consisting of 15 five-room dwellings, a garage and a caretaker's cottage, supplied with heat and hot water from a central plant. Heating costs are around $4.50 per month com-



Shaker Square in Shaker Heights, Cleveland, which has been served by a coal-fired boiler plant from the time the development was started over 16 years ago. Today, this plant supplies some 700 apartments and multiple-family dwellings, 45 stores, 30 office suites, a large tavern, restaurant, bank, large theater and two filling stations.

pared to an estimated figure of $10 to $11 if each unit were heated separately.

That district heating is thoroughly economical also is borne out by studies such as one made in Cleveland for the M. A. Hanna Co. and reported on by Warren D. Spengler, Hudson, Ohio, at the meeting of the Rail Traffic Association in May, 1945. An area in Cleveland two-thirds of a square mile in extent and characteristically residential was selected. In this area there were two streets with an appreciable volume of commercial business, two laundries but no other industrial operations, and a group of apartment houses accommodating about one-third of the people. Some homes probably were built 60 to 90 years ago.

Quantity and cost of all fuel for space heating for the season 1943-44 was obtained by a house-to-house canvass. It was assumed that the boiler plant would be located on a railroad siding within half a mile of the district. Steam generated at 600 lb. per square inch would be distributed by pipeline to stations, where it would be reduced to 60 lb. to enter the residences for further reduction to a few pounds or ounces. Where hot-air heat was employed, suitable unit heaters would replace the hot-air furnaces.

Financing an Installation

Converting oil and gas to coal, it was found that the district consumed about 58,000 tons annually at a cost of $535,000, or $9.20 per ton. On the basis of demand related to weather, it was estimated that central facilities would require an investment of $3,000,000 per square mile, consume 70,000 tons of coal annually and return an income (assumed to be equal to the total spent for fuel by individuals) of $800,000 a year per square mile. The net earning for interest and profit would exceed 10 percent. In addition to cost of service, it was estimated that the user would assume the average cost of $150, financed on the installment basis, of facilities for delivering steam from the mains in the street to within the premises. Since it was taken for granted that the residents would readily contract for steam heat at a price the same as the cost of the fuel they used, 100 percent of the population was considered as customers. In fact, in view of the advantages to the user, it was felt that he might be willing to pay somewhat more for steam service, although the actual rate should be competitive with oil and gas in individual furnaces.

While district heating, as noted, goes back many years, a number of improvements and changes in conditions now make it even more attractive. These include:

1. More efficient steam-generating,

distributing and utilization facilities operating at higher pressures.

2. The growing trend toward smoke elimination and control, plus increased stress on reduction of fire hazards.

3. The growing interest and activity in slum clearance and rehabilitation in cities.

4. The need for new housing.

5. Increased civic-improvement activity, including new paving and sidewalks, which offer an opportunity to lay the steam mains at the same time.

6. The need for new heating facilities. Some 60 to 90 percent of present home-heating equipment is estimated to be obsolete or in need of major repairs.

7. The possibilities of securing air-conditioning, commercial, dish-washing, drying, refrigeration, cooking and other business to supplement space and water heating.

8. The possibility of serving the steam and power needs of industry.

9. The desire of the user for greater convenience and release from responsibility for heating-plant operation.

10. The desire of the user for lower heating costs.

All these and other considerations are arguments appealing to the user and the general public, as well as individuals and organizations with money to invest. As Robert L. Fitzgerald, vice president, The Duluth Steam Corp., Duluth, Minn., recently put it at a meeting of the Minnesota chapter of the American Society of Heating and Ventilating Engineers:

"Few people realize that a central steam public utility serving a given city would be a bigger business than the combined water, gas and electric business serving the same community. One only needs to check this comparison in his own home to establish this fact because it holds true for all other

What District Heating Offers

1. MAXIMUM CONVENIENCE – No coal or ash handling, no heating plant or fuel storage in the home, all-year-round heat and hot water by turning a valve and setting a thermostat.

2. LOW COST – As low as or lower than coal in individual plants and definitely lower than other fuels.

3. REDUCTION OF SMOKE AND NUISANCE—Smokeless combustion in large, efficiently operated boiler plants and elimination of the hauling of coal and ashes through the streets.

4. REDUCTION OF FIRE HAZARD—No heating equipment, commonest cause of fires, in the home.

5. ADDED SERVICE POSSIBILITIES—Commercial establishments and industries, air conditioning, cooking, laundry drying, etc.

DISTRICT HEATING IN A HOUSING PROJECT



Old Harbor Village development, in the Boston area. Replacing a slum area, this development is supplied with heat and hot water from the boiler plant along the tracks in the foreground.

homes and commercial buildings. Once this fact is thoroughly understood and appreciated by those rugged individualists of the current generation—that group corresponding to the spark plugs and promoters of railroads and utilities of past generations—you can expect to see accelerated construction and development of these utilities and the final solution of the heating problem, with effective elimination of smoke, well on its way. . . .

"The amount of money required to build all these central steam utilities frequently is offered as an obstacle to such a program. It certainly does take lots of money to build any public utility, whether it is gas, water, sewer, telephone, electricity or steam. The other utilities are all built now and the investment institutions, burdened with funds, are praying for just such a new utility construction program that will absorb billions of idle dollars before the investment pressure of these accumulations drives the going bond rate down to 1 percent through the relentless operation of the law of supply and demand."

Effect on Coal Producers

District heating, it must be conceded, is both feasible and practicable. The next question might be: "What does it mean to the coal producer?" To take some of the cons first—it might eventually mean a shift of some magnitude from present premium sizes to smaller sizes now selling at lower prices. This, however, is not an insurmountable objection since the stoker already is forcing a change in pricing philosophy. Second, it might mean a reduction in tonnage required to serve the domestic market, although gains at the expense of competition undoubtedly would go far toward offsetting economy losses and eventually would result in a net increase. Specifically, some feel that the over-all fuel savings would average around 15 percent, sometimes more, sometimes less. Distribution losses must be balanced against the increased efficiency in steam generation, but these are not sufficient to prevent a net reduction in quantity of fuel used.

Against these and other factors the coal producer is assured a market against all forms of competition. The consumer is assured service at no more than his present coal cost and definitely less than he could heat with oil or natural gas. In the Cleveland study, for example, the cost of gas averaged 1.26 times the cost of coal, while the total cost, including investment and maintenance (without supervision) was 1.53 times. No figures were given for oil but they probably would be about the same. Since gas and oil probably could beat coal in a central plant only in a very few instances, those who used it still would have to install, maintain and supervise their own heating plants, whereas the householder served by a central coal-fired steam plant would be absolved of all such responsibility.

Service for Consumer

Along with a cost no more and perhaps less than before, the consumer would receive the utmost in convenience—no heating plant; no fuel delivery, storage and firing problems; and no ash-handling problems. In other words, he would have truly "push-button" service all the year around with no responsibility beyond paying the bill. The basement could be eliminated if desired or would be available for recreation and other purposes. Homes would be cleaner and they and furnishings, including personal apparel, would require less painting, cleaning and renovation. That consumers are willing to pay extra for even part of these advantages is proved by the growth in installation of stokers, if not by sales of oil and gas burners. If all such advantages could be provided—as the central coal-fired steam plant does—at no more and perhaps less than the previous cost, there seems no doubt that the central plant and coal would win.

District heating from central steam plants also is seen as the best answer to the smoke and nuisance problems, where coal is coming under heavier fire every day. With such a plant, coal can be burned smokelessly and equipment is available for going even farther and trapping fly ash. Hauling of coal and ashes through the streets and getting them into and out of individual homes also is eliminated, with consequent improvement in community appearance. At the same time one of the largest causes of fires—home-heating equipment—is eliminated at one fell swoop.

Indianapolis is cited as an example of the smoke-elimination possibilities of district heating. Some 98 percent of the heating in the downtown area is done with steam from a central plant, which also serves an extensive residential development and a number of large industries adjacent to the area. On a still winter day an airplane view shows a clear central area surrounded by a smoke bank over the city's outlying environs.

Heating and hot water, as previously hinted, are not the only possibilities for central steam plants, which are just as adaptable and worth while in supplying industries with both steam and power. Air conditioning is a big opportunity for such plants. Rockefeller Center, in New York, for example, is air conditioned, with the exception of its two theaters, from two central refrigerating plants, and such plants are seen as natural adjuncts to steam-heating installations. Home dishwashing, clothes drying and other services also can be handled with steam. Steam cooking is widely used by restaurants, hospitals and similar institutions, and many are of the opinion that it can soon be developed for the home.

An additional possibility for steam plants is snow removal. It is true that it would mean carrying considerable capacity for this purpose alone, as well as a considerable investment in piping in streets. But if a central plant and a distributing system is installed it is relatively easy and considerably cheaper to provide extra capacity and piping for this purpose. There is every reason to believe that in many cases snow can be removed, from main thoroughfares at least, more cheaply and certainly more satisfactorily in the long run by melting it than by present cumbersome and costly methods.

Even Production Feasible

A possible byproduct of central-plant operation of interest to the coal producer is the opportunity it provides for storage and, consequently, for evening-out demand and working time. The central plant is not the entire answer to that problem, but it appears that it would help considerably.

Competition from oil and natural gas is tough and will get even tougher unless all the signs are wrong. Oil is doing a business in the domestic and commercial field of around 50,000,000 tons annually at the present time—or will be very soon. Natural-gas business is, or soon will be, the equivalent of 30,000,000 tons. Coal can never hope for recovery of all of it, but if it could get back 50 percent it would make a material change in the industry's picture. Then there are the 10,000,000 new homes, possibly aggregating the equivalent of 50,000,000 tons or more annually for heating. Can coal at the present time confidently count on getting two-thirds of them?

District heating is a likely—perhaps most likely—method of insuring that coal does not lose out in the race for new or replacement business. It is practical, it provides the maximum convenience for the user, it costs the user less than oil or natural gas, it is a good answer to the smoke and nuisance problems and it opens up possibilities in directions other than space and hot-water heating. It is, therefore, a movement well worth the attention, support and participation of the industry.

STRIPPING EFFICIENCY

Raised by New Methods and Equipment

Unit Substations Facilitate Power Supply With Safety — New Drills Ease Overburden Shooting Problems — Revised Hoist and Arc Welder Feature New Shovel—Improved Trucks Meet Strip Haulage Problems

PROGRESSIVE strip operators have long realized that the tendency toward increased cost of production growing out of deeper cover, higher wages and more expensive equipment must be continuously offset by better mining methods, higher unit output and lower maintenance cost. Some of the steps recently taken in the directions of better power, high-wall preparation, stripping and transportation—all among the tough jobs that must be tackled every day—are summarized in the following material.

In the field of power, for example, the interest shown by both manufacturers and users in the development and installation of modern unit substations seems to be leading to their general adoption. Providing greatly increased safety with simplified construction, they may be moved to a new location quickly and easily and insure a minimum of power interruptions. They are now available in an ample range of sizes for both the usual high-line and pit voltages such as, for example, 33,000/4,160 grounded "Y." Similar stations for 4,160/220/440 volts for field use await a firm order from the field.

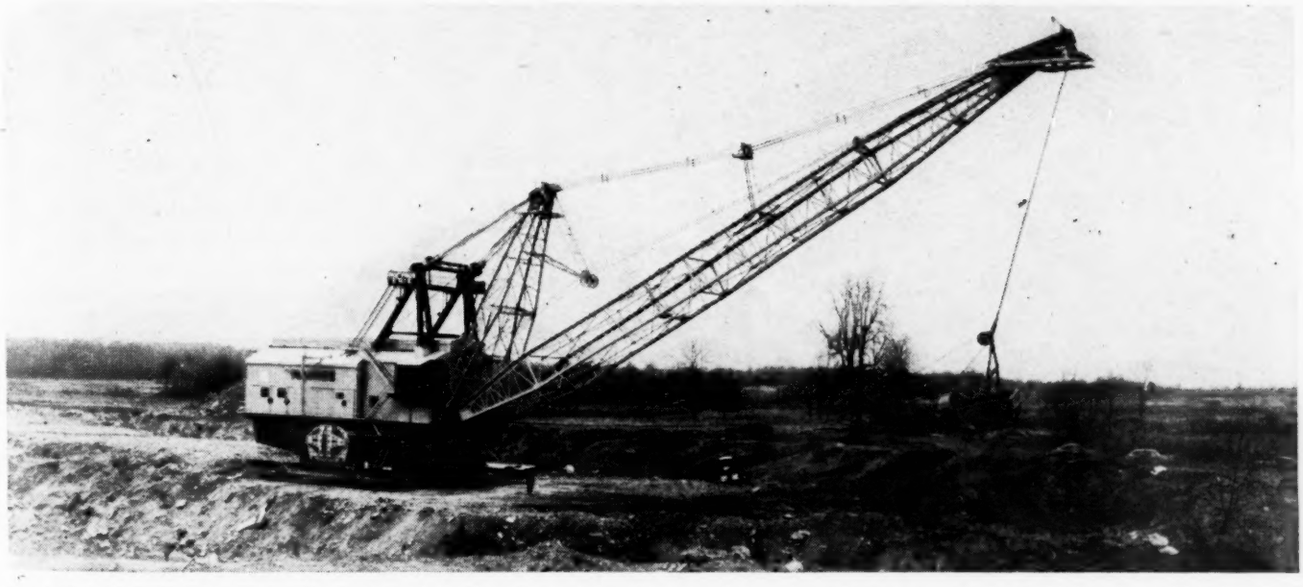
Special Equipment Designed

While manufacturers continue to bring out better designs and heavier machines with higher capacities, which are put into service as fast as they are produced, some mining companies have built drills, truck bodies and other equipment in their own shops to solve special problems. Thus, reflecting increased consciousness of their overburden problems, they are building new types of drills and buying heavier units that make larger holes at higher speeds.

Another noticeable trend is the addition of explosives engineers to mine organizations to make sure that the overburden is properly blasted for low-cost removal with low stripper maintenance. This is especially important with draglines, which are increasing in number and are taking over the stripping job completely in more and more pits. Paralleling the growth in the importance of the blasting problem, explosives manufacturers are increasing their service, with special emphasis on questions involved in shooting with new-type drills and larger holes.

Transportation developments still are in a fluid state. Truck haulage is growing in favor for gathering and short hauls, with heavier equipment and diesel power figuring in a good share of the new orders. Track haulage is in high favor for long hauls with standard rail equipment. Reduced grades save power and are getting more consideration. At one property, where 100-ton diesel-electric locomotives are employed, the maximum grade is held to less than ½ percent. Reducing haulage distance also can be accomplished by moving the preparation plant to the new pit, where it is perhaps three miles or more away from the old. This already has been done in a number of cases.

The meeting point in truck and rail haulage—the transfer station—also is in for improvements. As an example, one company has built a low-head conveyor-



Typical of dragline change in size and use, this 25-cu.yd. electrically operated walking dragline with new-type controls, installed late in 1945, epitomizes the growing trend toward use of this equipment for the entire stripping job. They handle deep overburden efficiently, but for best performance require more care in drilling and shooting overburden.







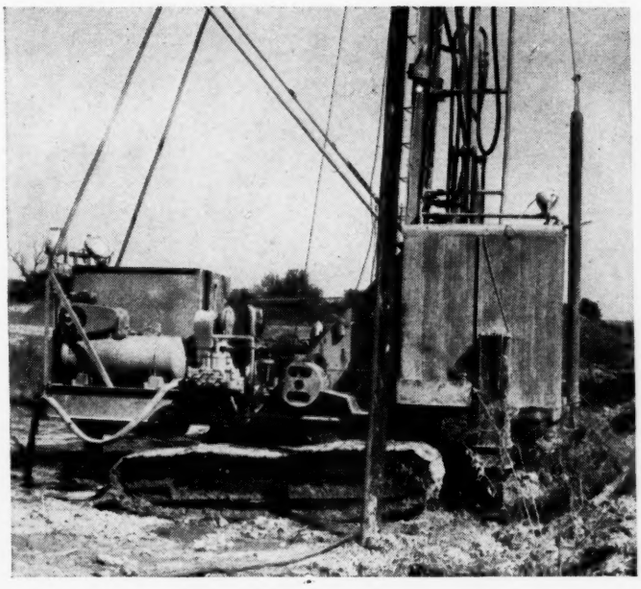
type station with a very small receiving hopper. It is built so that 80 percent of the equipment may be dropped down on a railroad car, moved and reerected over night. This requires duplication of but a small part of the plant—just enough to get the ramp to the new location before the change is made. The design permits cutting the ramp height to a minimum, thus keeping the grade low.

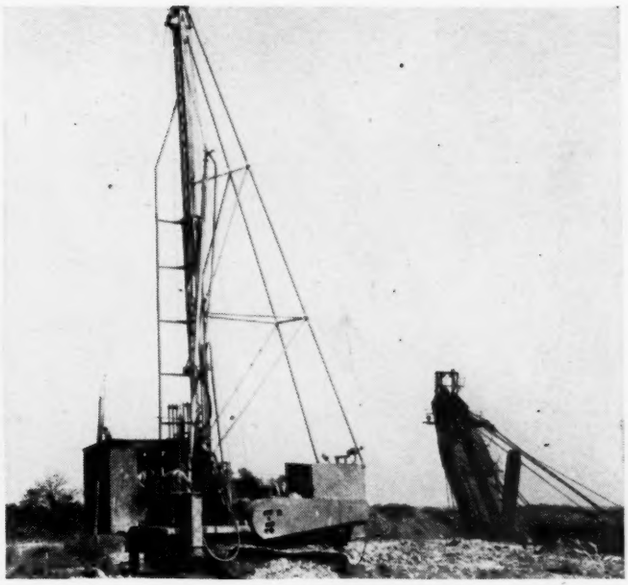
Special Drill Handles High Holes

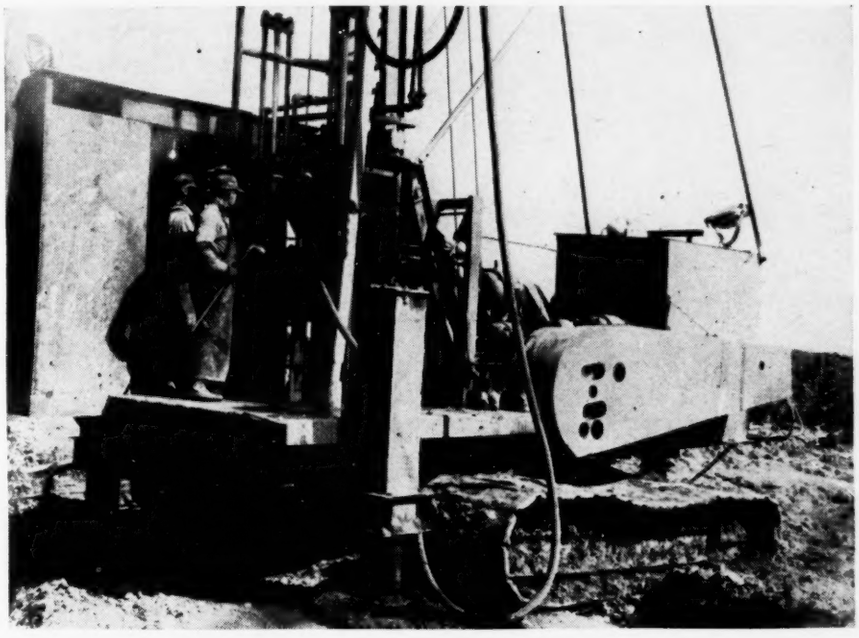
The drilling of sandstone normally is a tough job, especially when it lies high in the bank. The drill shown in these illustrations was built in a mine shop to solve both these problems. The presence of a heavy layer of sandstone up in the bank out of reach of the usual sidewall drill required a different design and accounts for the towerlike structure. Tower, platform and other equipment are carried on the chassis of a heavy standard drill rig.

The working platform may be extended out 8 ft. to reach a sloping bank and is retracted for moving. The driving power, initially a gasoline engine, is to be replaced with an electric motor. The crawlers are electrically powered.

Auger sections are 6 ft. long and the special bit (see illustration) cuts a 6¼-in. hole to a distance of at least 60 ft. The cutting edges of the bit are not designed to follow a common groove but are ground and positioned to make individual grooves of equal cutting value. The cutting edge is a special-alloy insert silver soldered to the cast-steel body. Special grinding equipment is provided for sharpening. Long cutting life is a feature of these cutting edges, along with many regrinds from a bit. A 54-ft.-long hole has been reported drilled in the sandstone in twelve minutes.









Improved Rotary Rig Speeds Drilling

This rotary overburden drill, intended for limestone and other hard material, is mounted on a crawler chassis provided with three-point leveling through the use of hydraulic jacks. The rotary drilling head was purchased while the stems were fabricated by the coal company on the basis of experience with similar units. Bits are provided by a manufacturer of oil-well equipment.

The main drive is a 40-hp. adjustable-speed slip-ring motor. A V-belt drives a countershaft, which transmits power through clutches to the drill drive, hoist drums for handling stems and the crawler drive.

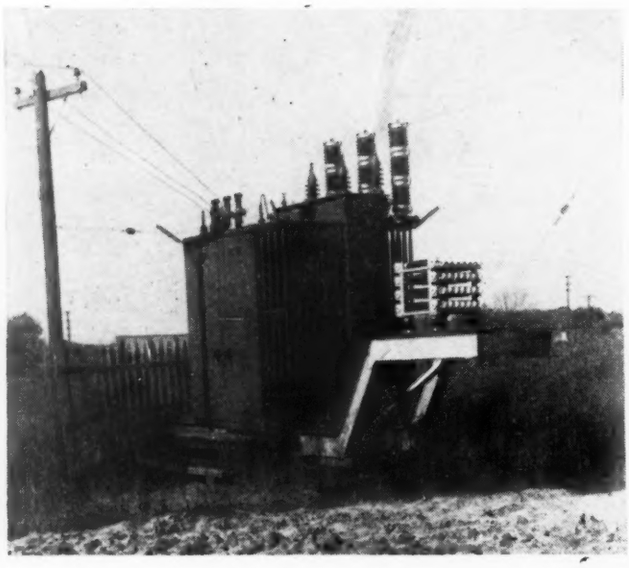
Drill stems are 30 ft. long and two stems reach the necessary depth. They are 4½ in. square and are made of two 4x½-in. steel angles welded along the edges. Standard hollow oil-well screw connections are welded into the ends of the hollow stems. The cutting bits (see illustration) are of the regular oil-well type but are smaller in size, making holes for 6-in.-diameter explosive. T chuck has a square hole to take the stem with a clamping screw on one side only. In operation, the stem is chucked, the drill run to the limit of the hydraulic feed (about 7 ft.) and then the stem is rechucked for another downward extension.

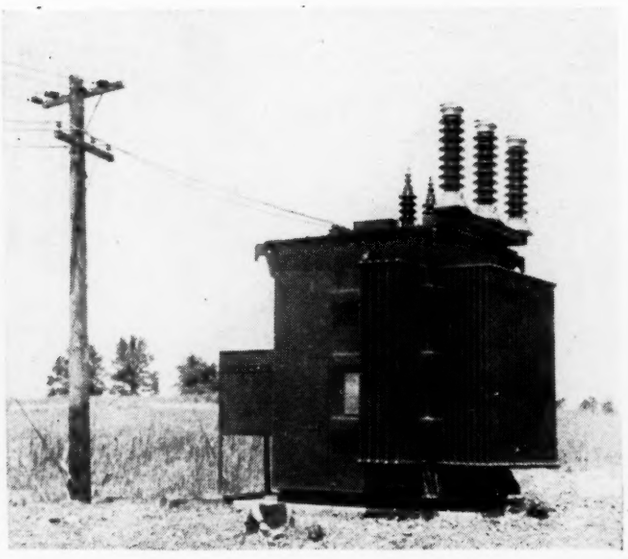
Water is supplied through the hollow stem while drilling by means of a duplex pump driven by a 20-hp. motor. Oil for the hydraulic drill-feed cylinders is fed by a rotary pump with a 10-hp. motor.

Auxiliary devices include an air compressor driven by a 5-hp. motor with storage tank for loosening mud or cuttings from the bottom of the drillhole by blasts of air. Another is a small rotary pump driven by a 3-hp. motor for operating the three leveling jacks. Leveling is gaged by a plumb bob mounted near the pump controls. The three jacks lift the weight off the crawlers, even lifting the crawlers, to provide a solid drilling foundation. The pads at the bottom of the jacks are about 32 in. in diameter.

The mast is telescoping. For long moves, the top section may be dropped, making the rig more stable.

Three three-phase plug-in sockets are provided at the wiring terminal, one for the supply cable, one for connect-





ing a second drill and a third for serving other devices, such as a pump or a coal drill in the pit. This saves running multiple cables. With two drills teamed together, four machines may be operated from one supply cable.

Portable Substations Facilitate Power Supply

These modern 33,000/4,160-volt grounded-"Y" substations, built as units, are mounted on heavy runners for movement by tractor or on short runners for moving by special trucks. They also have other advantages. Being built as a unit, they are much safer than the conventional single-phase transformers because there is no outside wiring aside from three wires in and four wires out. Switchgear and instruments are mounted inside the case, which may be locked, and lightning arresters are permanently installed on the top. Grounding resistors, still furnished as a separate item, are mounted on the top of the case by some users to complete the job.

These unit substations may be moved and put back into service in a matter of hours. Power is kept near the work, reducing the length of high-wall conductors and the number and duration of power interruptions. The cost of moving and setting up is relatively small.

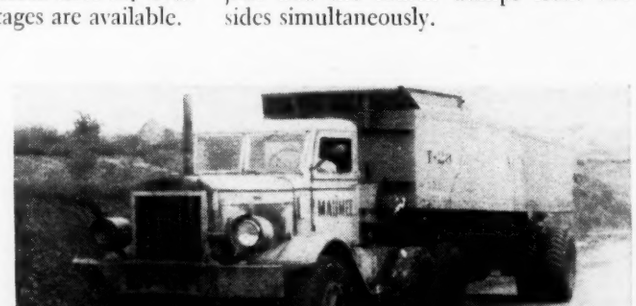
While the units illustrated are the 33,000/4,160-volt grounded-"Y" substations described, various sizes for both high-line and pit voltages are available.

Modern Trucks Haul More Efficiently

The four makes of modern haulage units illustrated have been purchased recently by three widely separated stripping concerns in Illinois and Indiana. They have capacities of 30 to 35 tons and are powered by diesel engines—none supercharged. All but one are four-wheel drive. However, they are of two types: that is, one has a front-wheel drive.

Stronger semi-trailer bodies have been prescribed as a result of experience. The dumping methods differ to accommodate bin and road arrangements already in effect. Three are bottom-dumping jobs and the fourth dumps from two sides simultaneously.



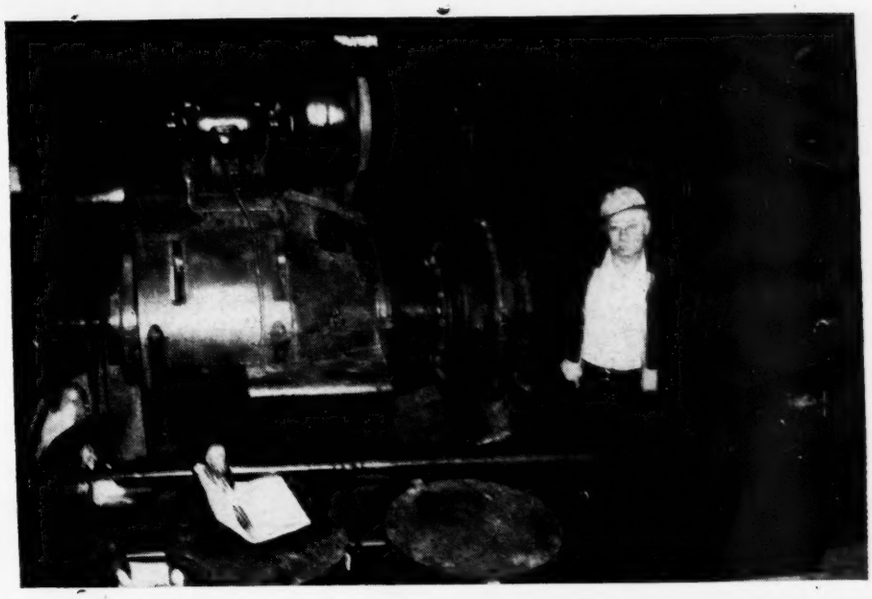








Other companies in the same area recently have bought similar units but with some changes in detail. It might be inferred, therefore, that these units indicate the trend of thinking among experienced strip operators, since these three companies have been using automotive haulage long enough to wear out one generation of equipment, thus testing the capacity and speed characteristics best fitting strip-mine requirements.

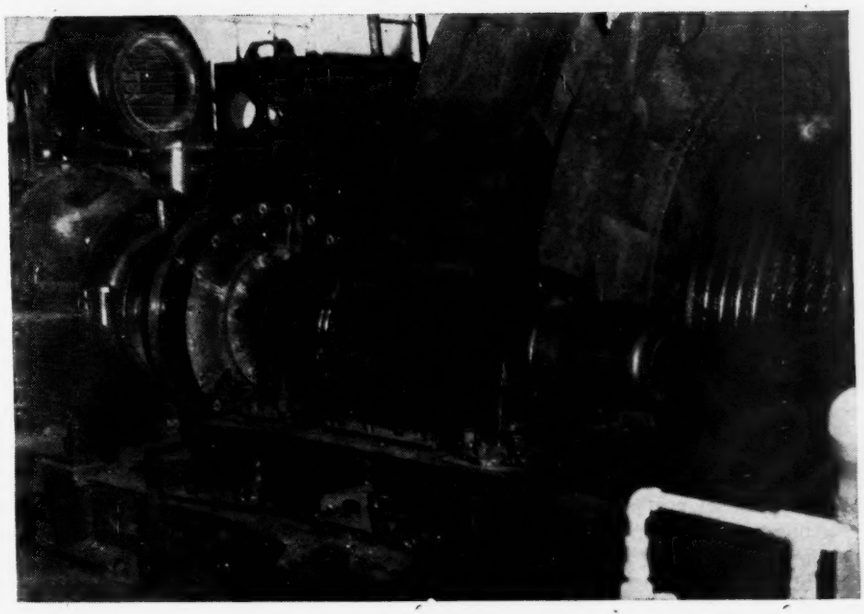


New Ideas Included in Strip Shovel

This recently installed shovel has at least two new ideas built into it. The hoist-drum drive is one. While the two-motor idea is retained, the mechanical hookup has been considerably modified from the customary arrangement of a shaft between two motors with a single pinion driving the drum gear. On this shovel, the two d.c. motors, each with its coupled shaft and pinion, engage the drum gear at points 180 deg. apart. A friction clutch limits the torque that can be applied. The pinion shafts are each carried in two roller bearings, one on each side of the pinions. Gears and pinions are herringbone. (Details of this drive are illustrated at the right, and a view of the shovel in actual operation may be seen at the top of this page.)

Two advantages are cited for this drive. The stress on the gear section is cut in half and the pressure on the drum-shaft bearings is equalized. The first is expected to eliminate gear breakage; the second, improve lubrication.

An arc-welding set has been made a part of the equipment on this shovel—for the first time, it is believed. This ends transportation and handling difficulties and attendant loss of time.



SILICONE RESINS

Raise Insulation Operating Temperatures

What Silicone and Silicone Resins Are — How Their Application to Insulating Materials Can ReduceWeight of Motors as Much as 50 Percent — What the Possibilities Are With Certain Types of Motors

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Westinghouse Electric Corp.
East Pittsburgh, Pa.

APPLYING silicone resins to insulating materials makes possible a weight reduction of 50 percent in certain general-purpose industrial motors. These resins, when used in combination with inorganic insulating substances, such as mica, asbestos and fiber glass, produce materials with a higher thermal endurance than the conventional materials in use today, since these are restricted by temperature limits set by The American Institute of Electrical Engineers Standard No. 1. These temperatures are based on the thermal endurance of the conventional materials and such endurance becomes the primary basis for establishing general machine ratings. Therefore, any development that greatly improves the thermal endurance of insulation is of real importance to the user of industrial motor equipment. However, there are frequently other design considerations that outweigh thermal endurance so that on some equipment little advantage can be gained. Each application must, therefore, be analyzed carefully by the design engineer.

"What is silicone?" "In what form is it available?" Silicone is a generic name applied to a considerable group of semi-organic compounds that link the organic and inorganic materials. Several of these silicone compounds are resins resembling organic varnish resins in their physical characteristics. The molecule of the silicone resins has an inorganic structure (a silicon-oxygen chain) so that the resins have tremendously greater thermal endurance than the best of the conventional organic resins. Many combinations of molecular structures are possible with these silicone materials and they may serve numerous purposes. For example, they are used as insulating varnishes, insulating resins, lubricating greases, filling compounds and fluids for various applications.

Silicone varnishes are available in forms similar to those with which the industrial motor user is familiar. Some silicone varnishes are made with organic solvents. Others are of the solventless type. They are used to impregnate and dip-coat coils, insulation and wound equipment by processes similar to those in which organic varnishes are used. Silicone varnishes normally require higher baking temperatures than do organic materials; usually 225 to 275 deg. C. For this reason, it is essential that a very minimum of organic material be contained in the insulation at the time of the high-temperature bake. Therefore, organic resins must not be employed in the manufacture of composite insulation to be used in conjunction with silicone varnishes.

If the design engineer is to attain the maximum utility of the thermal endurance of the silicone resins, both surface and subsurface insulation must be thermally stable and moistureproof. A complete line of insulating materials incorporating silicone resins with various inorganic base substances, such as mica, glass and asbestos, has been developed, with limited availability. These materials are available in the same forms as the more familiar Class B materials, and a list of them is given in Table I.

Small induction-motor stators have been wound with silicone-bonded glass-mica slot cells with silicone-varnished glass-covered wire for the coils and silicone-bonded glass-mica phase insulation. The completed stator was then

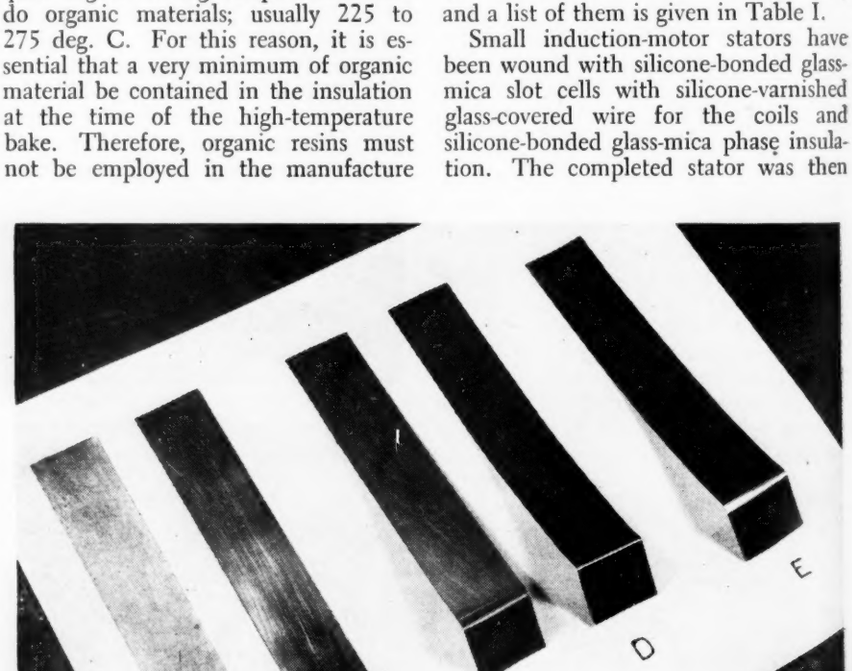


Fig. 1—Comparison of silicone and high-grade organic varnishes on test panels under the following conditions: A, silicone unaged; B, organic unaged; C, silicone aged 2½ hours at 250 deg. C. and bent around ⅛-in. mandrel; D, organic aged and bent the same; E, silicone aged 200 hours at 250 deg. C. and still in good condition against organic varnish deteriorated and badly damaged after but 2½ hours.

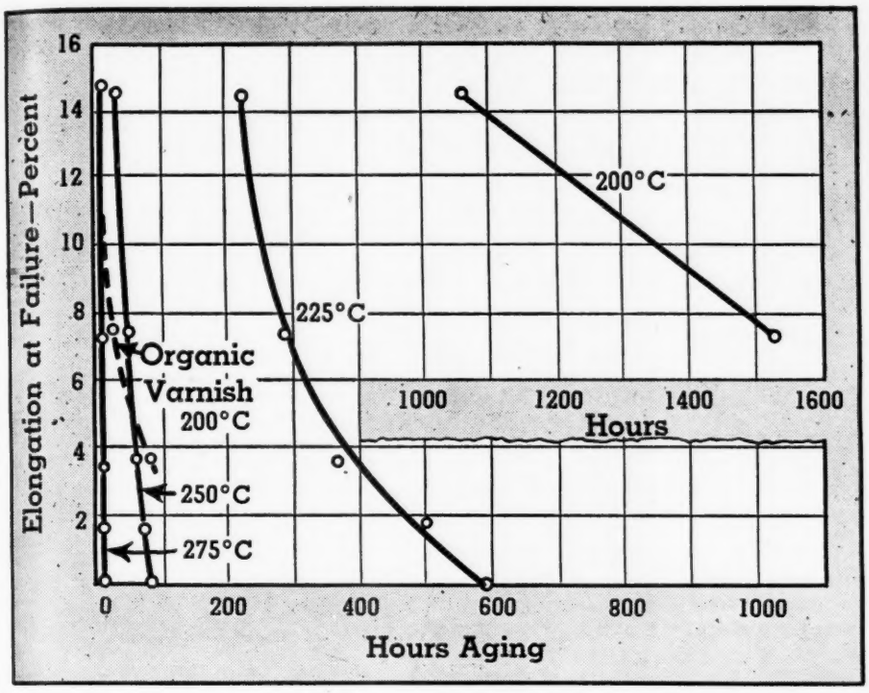


Fig. 2—Comparisons by elongation of silicone- and organic-varnish films 0.002 in. thick after thermal aging.

vacuum impregnated in high-temperature silicone varnish to furnish the waterproof external coating.

The field coils of small direct-current motors have been wound with glass-covered silicone-treated wire and given a vacuum impregnation and two dips before being placed on the pole pieces. These same materials were used in the armatures, but baking temperatures were lowered to 200 deg. C. because the solders now available are likely to flow at that temperature. Still other silicone materials have been used in larger machines where pre-insulated and formed coils are used. As examples, silicone-bonded glass-mica tape has been used for ground insulation and silicone-sized glass tape for the outer protective wrapping; coils have been impregnated with silicone varnish; and the completed armature or field has been given a final dip and bake in silicone varnish.

The superiority of silicone-varnish glass cloth as compared to standard Class B varnished cloth after 24 hours at 250 deg. C. has been demonstrated. The silicone-treated cloth retains its original flexibility whereas the Class B material is severely darkened and embrittled, in addition to losing its desirable electrical properties after only two hours. The panels in Fig. 1 illustrate aging characteristics of silicone and high-grade organic varnishes. Samples A and B are unaged panels coated with silicone and an organic varnish respectively. Samples C and D are the same materials after aging 2½ hours at 250 deg. C. These samples were tested in accordance with the American Society for Testing Materials, heat-endurance test procedure, which specifies bending the panels around a ⅛-in. mandrel through 180 deg. Sample E is silicone varnish aged at 250 deg. C. for 200 hours and subjected to the same test. While not illustrated, some types of silicone resin have withstood this test after aging more than 1,000 hours at 250 deg. C.

Further measurement of the behavior of silicone films on aging is shown in the curve in Fig. 2. The percent elongation to mandrel failure of 2-mil. films has been plotted versus the aging time at 275, 250, 225 and 200 deg. C. For comparison, a curve is shown for 2-mil. films of an organic varnish used in Class B equipment aged at 200 deg. C. From these data it has been found that in the range from 200 deg. C. the silicone resins rather closely follow the "Ten-Degree Rule" that the life of the resin doubles for each 10-deg. C. drop in temperature. In Table II data taken from Fig. 2 illustrate this rule.

Silicone insulating materials offer somewhat more resistance to moisture than conventional materials using organic varnishes. Stripped films were used in the test for determining moisture permeability by clamping them as membranes over the open mouth of Payne permeability cups and measuring the weight loss under a controlled temperature and in a dry atmosphere. Data obtained show that no more water seeps through the unaged films than through the better waterproofing insulating varnishes or soft vulcanized rubber. After aging 30 days at 200 deg. C. the silicone film has shown a consistent trend toward improvement, whereas organic films cannot be depended upon, as they may or may not improve. Tests on com-

Table I—Available Forms of Silicone-Resin Insulation

Item	Size	Use
Silicone-varnished glass cloth	Continuous rolls 18 in. wide, 0.004 and 0.017 in. thick	Backing or composite
Silicone-glass-mica wrapper	Sheets 18x36 in., 0.008 and 0.010 in. thick	Coil wrapping
Silicone-glass-mica glass material	Sheets 18x36 in., 0.023 in., thick	Slot-cell liners
Silicone-glass-mica wrapper	Sheets 18x36 in., 0.015 in. thick	Phase insulation in stators
Silicone-varnished glass-covered wire	All standard sizes	Magnet and stator winding
Silicone filling cement	.....	Plastic filling cement—not rigid
Silicone-bonded glass-mica tape	All standard widths; thicknesses, 0.0055 and 0.0075 in.	Ground insulation for coils
Silicone-sized glass tape	Widths up to 1 in.; thicknesses up to 0.015 in.	Protective outer wrapping for coils
Silicone-sized asbestos cloth	Sheets 36x36 in., 0.035 in., thick	Cushioning material

Table II—Failure Time of Silicone Insulation in Hours

Aging Temperature Deg. C.	Elongation of Test Sample 14.4%	7.2%	3.6%	1.8%	Craze Failure Time
250	36	55	63	80	85
225*	225	290	375	500	590
225†	205	314	360	456	485
200*	1,060	1,630	...	...	...
200†	1,160	1,790	...	...	...

*Actual. †Calculated by "Ten-Degree Rule."

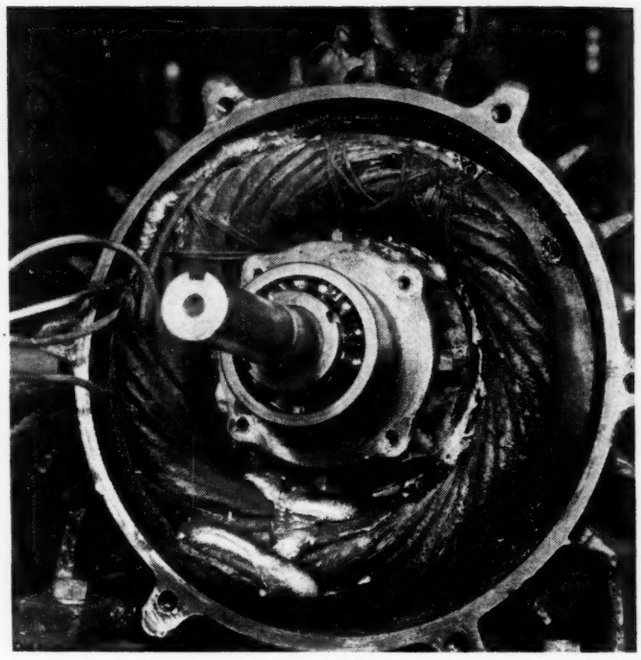


Fig. 3—Bearing failure rather than insulation deterioration ended the 3,376-hour test of this motor operating at a 250-deg. C. hot-spot temperature. Even molten metal caused little insulation damage.

plete equipment confirm these findings. On equipment given moisture and thermal cycling tests the resistance to moisture has improved with time.

Some low-viscosity silicone fluids of the lubricant type make excellent water repellents. These fluids prevent water from forming a continuous film on a surface treated therewith. It has even been suggested that paper raincoats could be made and fishermen regard the fluid as excellent for floating dry flies in fast water.

One very interesting vibration and thermal cycling test was conducted on a group of silicone and Class B insulated coils. Various methods of insulating were employed. The coils tested used such materials as mica tape, glass and asbestos-wire covering with various types of mica wrapper and glass and asbestos finishing tape. One of the groups of coils was made up of silicone-treated glass-covered wire, silicone-bonded glass-and-mica wrapper and silicone-sized tape, with silicone treatment applied to the completed coil. These various coils were placed in a 28-in.-diameter d.c. motor armature with 28-in. core length for convenience only. The armature remained static and was vibrated by external means. Severe thermal cycling was obtained by supplying 750 amp. at 420 volts a.c. 72 times per minute. This load was intermittent and was held for three seconds' duration. During this test temperatures around 230 deg. C. were observed. The tests covered 16 hours per day for a period of 36 days. Examination of the test coils revealed that while some of the Class B insulated coils had not failed, they showed signs of thermal aging and embrittlement of the resins. The silicone coils not only withstood the test satisfactorily but the insulation was still in excellent condition.

So that the life of the silicone insulation be at least equivalent to that now obtained with Class B insulation, it is suggested that the limit for the permissible observable temperature by resistance be set 40 deg. C. above the present Class B limits. This general rule is offered because certain types of equipment have special temperature limits for Class B insulation. It is proposed that the general limit corresponding to A.I.E.E. Standard No. 1 be 175 deg. C. for hot-spot temperature. This includes a 5-deg. C. increase in the allowable difference between the observed value and the hot-spot temperature.

There are three important ways in which improved thermal endurance properties may be utilized by design and application engineers in the industrial field. They are:

1. A reduction in size and weight of electrical equipment where the operating temperature can be increased and where no reduction in insulation can be tolerated.

2. Increased service life of the insulation where it is desirable to maintain conventional size, weight and temperature limits.

3. Operation in ambient temperatures above the permissible limits for conventional types of insulation.

All the applications to which silicone resins and composite insulation have been introduced is beyond the scope of this article. However, here are a few typical examples of their use in various equipment at the present time:

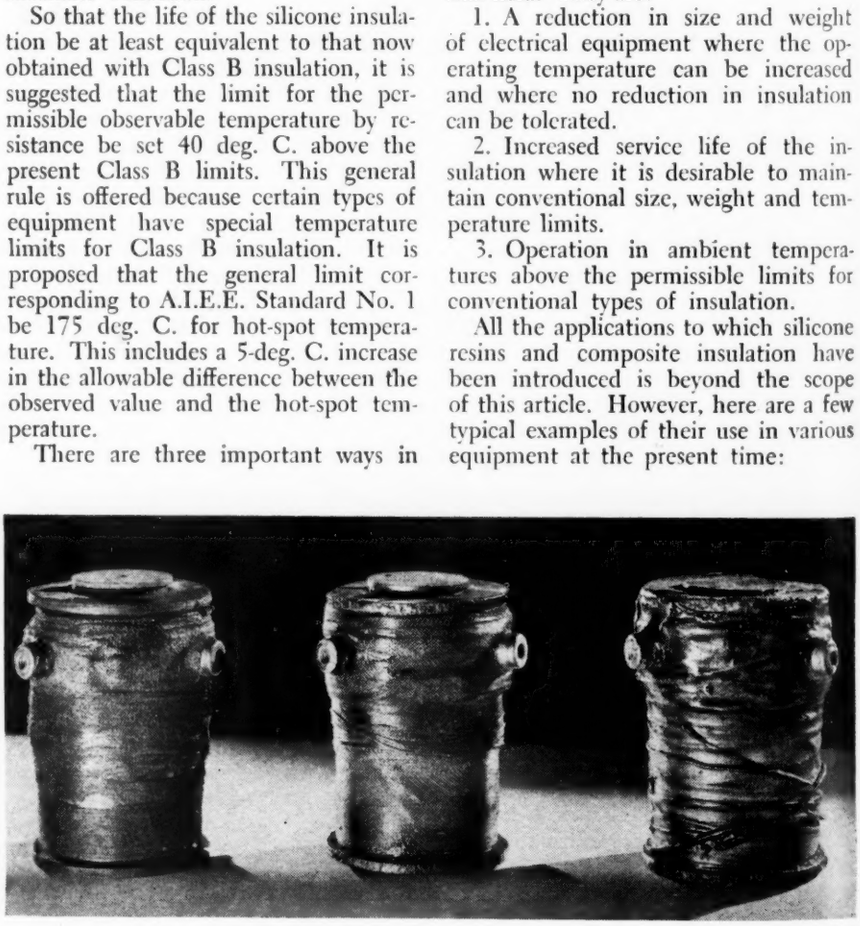
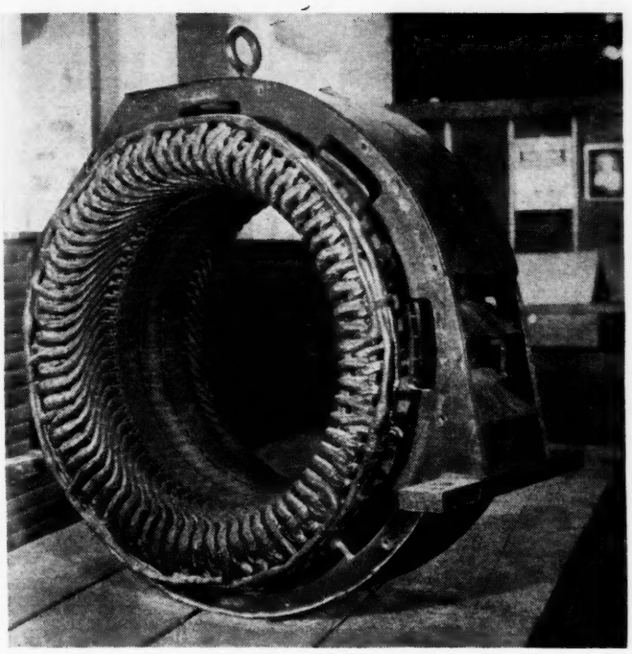


Fig. 4—Comparison of silicone and high-grade organic varnishes on magnet coils (left to right): Class A insulation aged 200 hours; Class B insulation aged 2,750 hours; HTS insulation aged at 5,000 hours—all at 235 deg. C as observed by resistance.



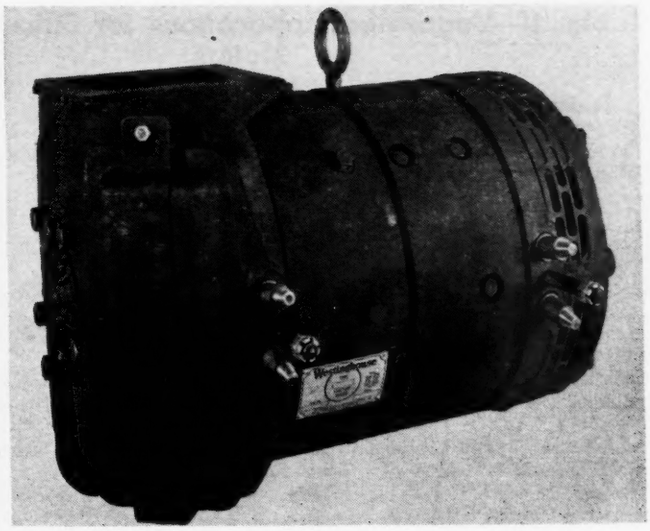


Fig. 6—Silicone-insulated traction motor for street car.

Fig. 5—After 2,966 hours of operation at an estimated hot-spot temperature of 250 deg. C., the HTS insulation on this 250-kva. 440-volt generator still was in satisfactory and usable condition.

Early in 1942 a totally inclosed fan-cooled induction-motor stator was wound for 10 hp., using the best available Class B insulating materials. This stator was given a vacuum impregnation and two dips in silicone-resin varnish. The motor was normally rated at 3 hp. with Class A insulation and 5 hp. with Class B. A series of engineering tests, including overload temperature runs, was made. The overload runs included a 13-hour test at 300 deg. C. total operating temperature and a peak overload test during which 500 deg. C. total temperature on the winding was observed by thermocouple. These tests were followed by an accelerated life test on the insulation during which the motor winding was operated at a 210-deg. C. rise by resistance (250-deg. C. hot-spot temperature) for 3,376 hours. The motor was dismantled and examined periodically. The winding also was subjected to a high humidity test. The test was terminated by a bearing failure that damaged the winding. Fig. 3 shows the failure. Molten aluminum ran over the winding, damaging it but little, however.

A second motor was rated 25 hp. at 1,750 r.p.m. and was built in a 15-hp. frame. The motor was insulated the same as the one first described. This motor ran over 3,200 hours at 250-deg. C. hot spot before a mechanical failure of the bearing stopped the test.

A third motor, built the same way except for use of silicone materials throughout, is still driving an m.g. set after completing over 4,100 hours at 185-deg. C. hot-spot temperature. The set is shut down frequently so that in all respects the motor sees actual service.

Another example is a 7½-hp. motor driving a caustic pump in a moist atmosphere. This motor operates 24 hours a day and is started once a week. It has been in service over eleven months, as against only a little over five months for a Class A insulated motor.

A fifth motor, rated at 25 hp., drives an evaporator pump in a wet location. This motor has been in operation over 13 months, whereas previous conventionally insulated motors failed in approximately six months.

One 250-kva. 440-volt generator was made with silicone insulation throughout the stator. As a preliminary temperature test the stator was short-circuited at 275-percent normal current. This load resulted in an observed temperature at 355 deg. C., which was held for six hours. Subsequently the stator was redipped and baked and then subjected to an accelerated thermal aging test. The test consisted of heating the stator on alternate days by loading the unit as a generator. The observed rise by resistance was 210 deg. C. (250-deg. C. hot spot). At the end of 2,966 hours the test was terminated even though the insulation still was in satisfactory condition.

A few mining-locomotive, steel-railway and trolley-coach motors have been made with silicone materials and are now being tested in the field. Some already have given service far beyond that obtained with conventional materials.

Magnet coils for relays and contactors and several hundred dry-type transformers have been insulated with silicone materials and placed in service.

The foregoing applications are typical of the ways in which the high-thermal-endurance properties of silicone resins and materials can be applied to industrial equipment. Table III suggests others. It will be noted that some applications overlap; also that some applications must be carefully studied to insure proper results. For instance, care must be exercised on machine-tool motors to insure that the higher temperatures involved will not affect the accuracy of machining. Another precaution to be taken is keeping the bearing temperatures at safe operating levels. The safe temperature for grease-lubricated bearings is 110 deg. C. total if the proper lubricant is used. It may be necessary to provide cooling for the bearings on some machines applied in a high ambient.

It must not be assumed that silicone insulation is a "cure-all" for motor ills. While it is an excellent insulating material, it must be applied with extreme care if maximum utilization of its properties is to be realized. As more and more equipment becomes available for handling the manufacturing processes, then—and only then—can there be extensive use of silicone motors.

To evaluate completely the possible advantages to be realized by using the increased operating temperature silicone offers, certain characteristics must be considered. The following study is based on increasing temperature only, speeds and insulation allowances being conventional. It should be remembered that other problems are introduced, particularly mechanical problems, as previously mentioned. Obviously, these problems can be solved only by experience on specific applications. Other considerations relate to performance—

Table III—Suggested Applications for Silicone-Insulated Motors

Reduced Weight per Horsepower by Operating at Higher Temperature With No Sacrifice in Life	Increased Life of Insulation While Maintaining Conventional Size, Weight and Temperature Rise	Operation in High Ambient Temperature
Rapid-reversing motors.	Loaders, drills, shuttle cars, cutters, etc., in mining applications.	Furnace motors.
Fan-cooled motors.	Creamery applications where humidity is high.	Roll-table motors.
Variable-voltage drives where ventilation is reduced at low speeds with normal current in windings.	Fluctuating loads with high peaks.	Ventilating fans.
Machine-tool motors where space is limited.	Operation in caustic and acid fumes.	Circulating fans handling hot gases.
Submarine-propulsion motors.	Pickling, cleaning and plating lines.	Dry-kiln motors.
Marine motors where savings in weight and space are important.	Tropical locations with high humidity.	Copper-mining applications, such as scraper hoists.
Some hoist applications.		Cooling-tower motors (high humidity and ambient).
Crane motors.		Open-hearth departments.
Wood working where motors are sheet type or built in.		Bessemer converters; forced-draft blowers in marine boiler rooms.
Short-time-rated motors with extremely limited weight and space conditions.		Boiler-room auxiliaries on shipboard—oil-burner, oil-pump motors, etc.

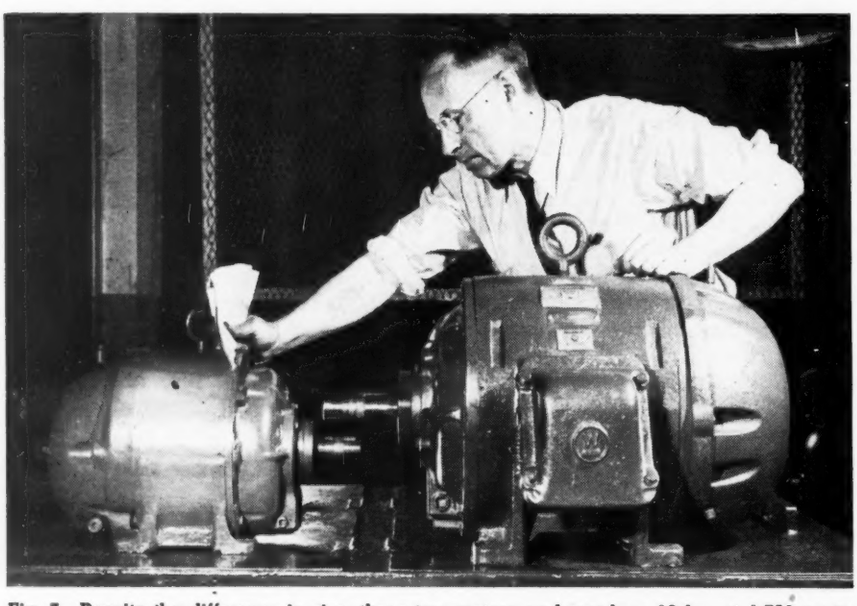


Fig. 7—Despite the difference in size, these two motors each produce 10 hp. at 1,750 r.p.m. The smaller has HTS insulation and weighs 210 lb. The larger has Class A insulation and weighs 410 lb.

efficiency and power factor. In other words, it should be recognized that the major advantages derived from silicone insulation are accomplished only through a balanced design.

Small Industrial Motors—Most designs in commercial production are Class A 40-deg. C. rise machines. Some weight reduction would be possible on certain designs in going to a 50-deg. C. rise without change in insulation. Further weight reductions would be possible on some of these by using conventional Class B insulation. On some motors, such as the open and splash-proof types, the torque, efficiency and power-factor requirements limit the advantages to be gained by use of the high-temperature insulation. On some totally inclosed fan-cooled motors the same factors may well apply. However, there may be more possibilities in redesign for weight reduction because the operating temperature, frequently the limit in design, has been increased.

Large Synchronous and Induction Motors—Larger and higher-speed machines could, in some cases, be reduced in weight by utilizing fully present Class B temperature limits. In addition, there are some larger or higher-speed units that could be made still smaller if an increase of 40 deg. C. were possible above present Class B limits. In most cases the maximum possible gain in size and weight reduction through increase in permissible temperature will require some sacrifice in efficiency and power factor on induction machines.

Large Direct-Current Machines—The effect of temperature on size and rating of this class of equipment depends upon design characteristics—particularly on the ratio of copper loss to iron loss. Their design is standardized through establishment of lines of frame sizes to fit widely varying conditions. This naturally results in some machines being larger and heavier than those specifically made to suit a particular application.

Wider Use Anticipated

As fibrous glass was introduced to various industries new hopes were held for higher operating temperatures but suitable treating materials were not available. Now, with silicone resins indicating that the desired results can be achieved, both in the laboratory and in the field, extensive use of high-temperature silicone insulation can be expected. Many types of electrical machines are larger and heavier than need be if high-temperature silicone insulation is used. In some instances it may be desirable to supply renewal parts treated with silicone for existing equipment that has a short life or requires increased power. Since silicone processes and materials are still relatively new and require additional development, the cost of the silicone-insulated machine is necessarily higher than the more conventional types. In any event, the new silicone materials must not be considered as the "cure-all" for all insulation problems but must be applied with caution and vision on specific applications where their use can be justified.

UNION RELATIONS

Help or Hindrance in Future Mining Progress?

THE WAR YEARS saw several bitter battles, ostensibly between the coal operators and the United Mine Workers of America but actually between the union and the federal government, with the coal industry and the public as more or less helpless bystanders. Perhaps another such battle is impending in the immediate future, and perhaps not. The odds are on the former rather than the latter, however, and that brings up this question:

Will union relations help or hurt coal mining in the future?

Some of the answer lies in what union leaders and their government backers consider as union objectives. If they take them to be nothing more than sandbagging industry, giving nothing in return, industry and the public are bound to suffer and eventually, when the economy becomes too one-sided, the only answer left is statism—government control over every action of all individuals, including the union members themselves. So far the United States has not come to that pass, but the forces that could bring it about already have been set in motion and if left unchecked indefinitely could hardly result in anything else.

If union objectives are considered to be helping industry and thus helping its membership by serving the public better, then union relations can be a powerful force for good. Organization, if properly directed, naturally facilitates cooperation with management in the eradication of bad practices and conditions, and in the promotion of efficiency, low cost and maximum service to the consumer. Only on these foundations can organization expect to prosper and increase individual earnings, while assuring continuation of the American system of personal freedom and enterprise.

Two Roads—Which One?

Depending upon union objectives, one road, to repeat, leads to statism. The other leads to increased cooperation for the good of all concerned—employees, management, investors and the public. The road to statism is easy to take. The road to cooperation requires real thought, patience, work and forbearance. It is the harder one. There is still time for union leadership and government to choose. There is still time, to be specific, for a choice in the case of the coal-mining industry. The next question is: "What can be done to make the choice the right one?" Perhaps a quick review of the history of union relationships in late years will throw some light on the answer.

The rebirth of the United Mine Workers with New Deal help back in 1933 took place with surprisingly small operator opposition. This reflected the widespread conviction that unionization would—as it did—stabilize the major factor in cost—labor—and thus remove one of the incentives to price competition, with its resultant demoralizing effect. For this the operators were willing to do their share in increasing miner earnings, placing their reliance on mechanical mining and other operating improvements to offset wage increases and thereby maintain low prices. Further ground for cooperation was found in battling competition and in other directions, and the union went on record in favor of increased productivity and the right of management to run the mines. It also insisted on its members living up to contracts and lent its aid in enforcement of penalties where such penalties were provided.

THIRTEEN YEARS IN UNION RELATIONS

THEN—1933-35	NOW—1944-46
MANAGEMENT	
Right to hire, fire, discipline and manage the mines guaranteed; foremen specifically excluded from unionization.	**Strong pressure being exerted to limit managerial rights by modification of agreements and otherwise; campaign to organize foremen being pressed despite exclusion clauses in contracts.**
CONTRACT OBSERVANCE	
Insisted on by union leadership; application of penalties concurred in by said leadership.	**Union leaders, with help of federal officials, have practically abrogated application of penalties for illegal stoppages; clauses still remain in contracts but campaign is under way to eliminate them.**
INDUSTRY SECURITY	
Contracts based on legitimate union objectives: wages, hours and working conditions.	**Demands being made that would force industry to pay the cost of and be used as the club for organizing other industries and busting other unions.**
EFFICIENCY	
Use of equipment guaranteed company; mechanical mining principles indorsed.	**Output per man-shift increased but not as much as hourly earnings; output per hour, however, dropped in 1944; union leaders still nominally in favor of higher efficency but attempts at "feather-bedding" being made.**
PRICE	
Coal and competition on the upswing after depression lows.	**Has increased faster, under the influence of wage increases, than price of oil while natural gas has gone down; coal prices also have outrun tons per man-shift by a wide margin.**

What's the picture today? Late in 1945, a good many million tons of badly needed production was lost in a strike called to force organization of a vital segment of coal-mining management—the foremen. That strike was called off, but only until a "more propitious" time. As to contract observance, union leaders have been successful, with federal help, in practically eliminating the assessment of penalties for illegal stoppages during the terms of contracts. The penalty clauses, however, remain for the present, although now practically meaningless, in addition to being the target of a union campaign to knock them out entirely.

A series of other demands pressed in recent wage negotiations and at other times also gives rise to doubts off-

setting such steps as the recent advertising sponsored by the union in the anthracite field, exhorting miners to produce more and more efficiently. These demands, which, if the union runs true to form, will come up again, include:

1. A royalty on production of, at present, 10c. a ton to be paid into the union treasury.
2. Use of nothing but union-made tools, materials and equipment in coal mining.
3. The right to call strikes at any time to support organization of other industries.
4. Fixing or limitation of crew size and make-up.
5. Limitation or elimination of the right of management to hire and fire, place or shift men, and discipline.

All these and other similar demands, it will be observed, are radical departures from what used to be accepted as the legitimate goals of labor unions, namely: wages, hours and working conditions. Rather they are aimed at at least three other objectives: limitation of managerial discretion and authority, use of the coal industry and its employees to organize other industries, and an opening wedge to "feather-bedding." In other words, the accent seems to be on invasion of the field of management rather than on cooperation with management for the mutual benefit of all.

Price Rises—Competition Breeders

History also shows a great increase in average hourly earnings in coal mining since 1933. This increase has been largely responsible for a major rise in prices, because increases in individual productivity have failed to keep pace with rising wage rates. Mining cost is still 60 to 65 percent wages, and, since coal does have strong competition, two fair questions might be: "Has the danger point been reached? If not, how close to it is the industry?"

Close enough, if not already there, is the answer to these questions. It can be argued that an industry can support a certain wage level and that it is good policy for it to do so. But when that level is reached and the industry has strong competition, further increases are dangerous unless other steps can be taken to avoid a rise in price. This is true even though no consideration is given to sharing the benefits of higher productivity with the consumer—something highly desirable as a means of strengthening the position of the industry.

That this is not merely idle talk has been proved in a number of industries where hourly rates border on the astronomical but where annual working time, as a result, is sharply curtailed. The fact that it could happen in coal mining cannot be lightly shrugged off. An excessively high wage rate is of little benefit to the worker if it causes a loss of business to competition, with consequent reduction in yearly working time and earnings.

What's the coal-mining situation? Some idea may be gained from the figures tabulated elsewhere in this study. It can be assumed that they reflect approximately the change in the competitive situation from the price angle. They show that coal-price increases between 1935 and 1944 ran substantially ahead of increases for oil and natural gas. They also show that productivity per man-shift in the same period failed by a wide margin to keep up with increases in hourly earnings.

The high in average bituminous mine prices was $3.75 in 1920; in anthracite, $6.11 in 1926. Figures for 1945 are not yet available, but it seems likely that the bituminous average was over $3.20 per ton and anthracite over $6.30. The conclusion is that another substantial increase in labor cost before output per man-shift has a chance to catch up might find coal fairly close to setting new all-time price highs, and thus in much more danger of presenting competition with a new opportunity to raid its markets.

Real Need—Genuine Cooperation

From a start in 1933 on a basis approximating the proper one between employers and organized employees, it can be seen that union relations in coal mining have strayed rather far afield in many respects in late years. The most direct attack on management has been the attempt to organize foremen. Perhaps the industry could work with part of its management beholden to the same union as its employees, but there is no assurance that it can function as efficiently as before. A few incidents that already have taken place may be the straws that show which way the wind blows. So far, these incidents indicate that supervisors who have taken out union membership lose both authority and standing—in fact, the very things that make them supervisors. Separated from management and regarded as no more than fellow union members by employees, the supervisor's outlook, if the union should succeed in its campaign, is not too cheerful, while if he loses his authority the prospects for

Stage Setting for Competition

	1944	Percent of 1935 Average
Hourly bituminous earnings...	$1.186	159
Hourly anthracite earnings....	$1.178	143
Tons per man-shift, bituminous.	5.67	126
Tons per man-shift, anthracite..	2.79	104
Bituminous mine value, per ton	$2.92	165
Anthracite breaker realization, per ton	$5.91	138
Crude oil at wells, per bbl.....	$1.21	125
Natural gas at wells, per M.c.f.	$0.054	93

higher efficiency in coal mining are considerably dimmed unless something else can be worked out.

Neither can the industry expect to make the progress now possible if it is forced to contribute money and serve as a cat's-paw in organizing other industries and busting other unions—which now seems to be one of the ideas of the union leadership. As much as any other one thing, coal mining has suffered from work stoppages, and such a campaign inevitably would mean more stoppages rather than less. Coupled with the invitation to competition that further increases in labor cost would entail, use of the industry and its employees in such fashion is scarcely calculated to foster conditions leading to expanding markets.

Is the answer legislation or is it something else? It might be the former but legislation in the hands of the New Deal seems to have a habit of strengthening the union leadership regardless of title, preamble, enacting clause and text, especially after the courts get through "interpreting" the will of Congress, assuming a measure survives the veto. But legislation of the proper type undeniably would help, not by attempting to restrict unions but by establishing standards of fairness designed to promote the necessary cooperation between industry and organized labor. As the National Association of Manufacturers puts it, a sound national labor policy should:

"1. Make employers and unions equal in responsibility under the law.

"2. Let Congress set the rules for genuine collective bargaining, free from coercion and violence, and then let government enforce these rules with strict impartiality.

"3. Provide safeguards for the public against strikes or boycotting arising from disputes between unions.

"4. Insure against strikes until all orderly procedures for settling disputes have been exhausted."

At the moment the chances of such legislation successfully running the gauntlet are rather slim. But public opinion is a powerful force when it finally is mobilized behind a course of action, and there is evidence that it will be exercised before the present trend can result in statism—especially if the facts are made available to all concerned, including the workers involved.

Meantime, there remains the immediate matter of the future of the coal industry. It now has before it the best opportunity in a great many years, provided proper judgment is exercised to prevent stoppages, interference with management and excessive cost increases not warranted by the trend in efficiency. Facts for the guidance of the mine workers and the public are the major need. While those facts are registering, mining management might well make a few demands of its own. Certain outstanding ones are:

1. Cessation of attempts to hamper and restrict management by organizing foremen, or otherwise.

2. Cessation of attempts to use the industry as a club in organizing other industries and busting other labor unions.

3. Elimination of strikes or threats of strikes until all the possibilities of settlement are exhausted.

4. Sincere consideration of the relation of wages, individual productivity and competition to the welfare of the industry.

5. Cessation of attempts at "feather-bedding" and reemphasis of the importance of increasing individual output—in other words, a good day's work for a good day's pay.

6. Cessation of government partiality, and development of a national labor relations policy fair to both management and men.

Summing up: it is no more than fair that in return for the huge investments in money and managerial and engineering talent designed to put the industry in position to compete and pay wages in the top brackets for all industries the operators should demand corresponding efforts on the part of union leaders, union members and federal authorities in the promotion of full and proper cooperation between management and men. Only thus can both take full advantage of the golden opportunity to serve the public that now exists.

REELS COVE MINE

Built for Long Life and Low Mining Cost

Tennessee Products Invests $800,000 in Full-Mechanical Mine Near Chattanooga—Coal is Handled With Conveyors and Rock With Loading Machines—5-Ft. Tube Forms Part of Outside Conveyor System

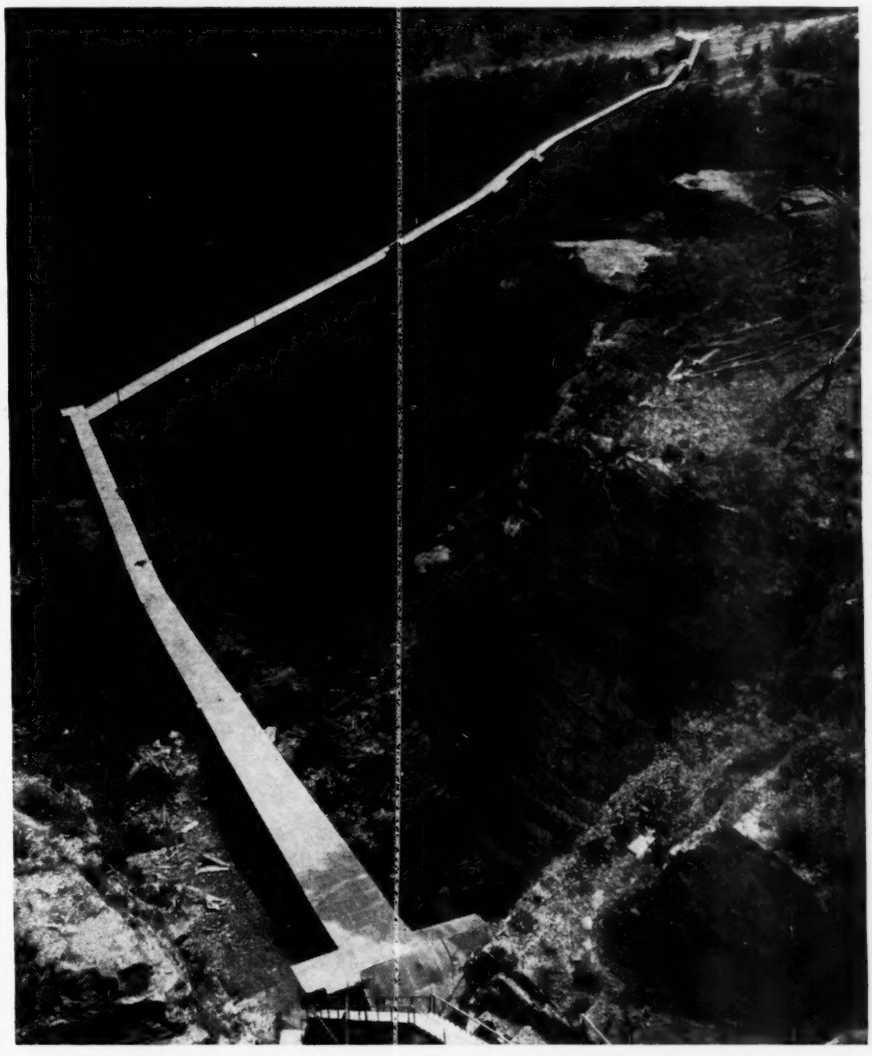
By J. H. EDWARDS
Associate Editor, Coal Age

TO WORK an 8,000,000-ton acreage now under lease and probably another estimated 15,000,000 tons available in an adjoining area, the Tennessee Products Corp. has spent $800,000 for underground mechanical equipment, railroad tracks and a new 2,000-ton-per-day plant. Christened the Reels Cove mine, the plant is located in Marion County, Tennesse, 19 airline miles northwest of Chattanooga. Here the Sewanee seam —normally 39 in. thick and free of partings—is mined by shaker conveyors, chain conveyors and belts, with a mobile loader handling rock in making height and grading for 4½-ton drop-bottom cars. Large storage capacity is provided in the dump hopper and surge bin, and a steel tube 5 ft. in diameter and 140 ft. long constitutes a part of the 3,000-ft. mountainside transportation system from the headhouse down to the tipple.

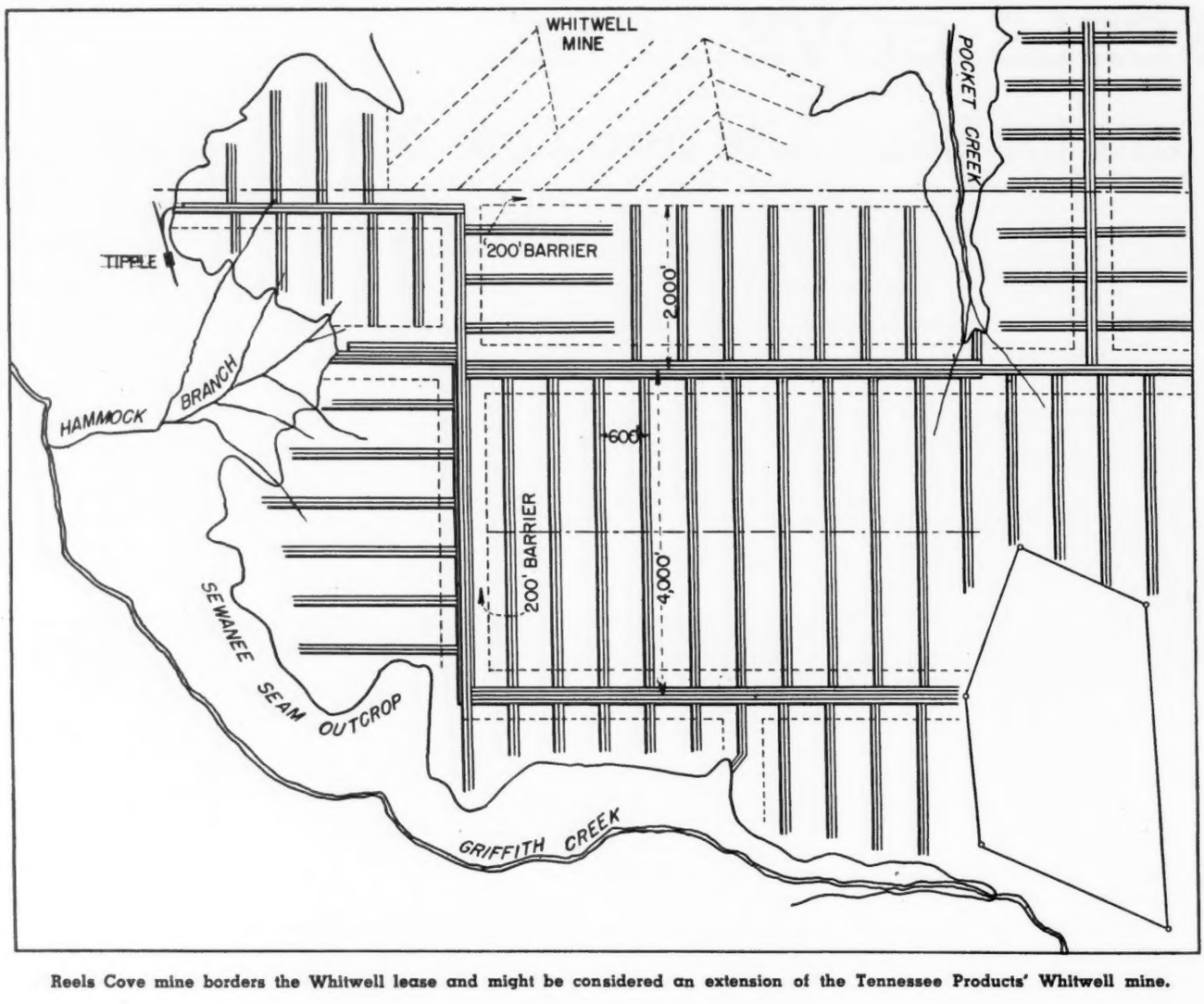
Adjoins Whitwell Mine

Carl McFarlin, president of the company, who, with George R. Barnard, mining engineer, Birmingham, worked out the design and engineered the job, is justly proud of the plant and its performance. Mr. McFarlin, a technically trained mining engineer, was for many years chief engineer for the Black Diamond Coal Mining Co., Birmingham, which operated Whitwell mine until it was taken over by the Tennessee Products Corp. in 1937. Whitwell mine, also in the Sewanee seam and adjoining Reels Cove, but six miles closer to Chattanooga, has been in operation for 60 years and now has about 4,000,000 tons of coal left. Included in the Reels Cove project was the installation of a railroad-car dump hopper, feeder and belt conveyor at Whitwell tipple and preparation plant so that 1x0-in. coal from Reels Cove can be washed (in-transit rate) at the job and table plant which Mr. McFarlin pioneered at Whitwell some years ago. Both Reels Cove and Whitwell mines are on lands owned by the Tennessee Coal, Iron & R.R. Co., subsidiary of the United States Steel Corp.

The Tennessee Products Corp. was organized under that name in 1926, taking over the Chattanooga Coke & Gas Co. and the J. J. Gray properties at Rockdale, Tenn., consisting of blast furnaces producing ferro-phosphorus. Mr. McFarlin became associated with the company in 1938, as vice president and general manager, and in 1939 was



Outside view at Reels Cove mine of the Tennessee Products Corp. A 5-ft. steel tube (lower center) carries the coal down through a natural notch in the 150-ft. rock cliff to feed the mountainside transportation conveyor system consisting of a rope-and-button conveyor and two belt conveyors.



Reels Cove mine borders the Whitwell lease and might be considered an extension of the Tennessee Products' Whitwell mine.

made president. In 1941 the company acquired the Rockwood (Tenn.) iron furnaces, which had been down ten years, and put them into the production of ferro-manganese.

The company operates Semet-Solvay ovens in Chattanooga that supply gas to the city and some of its industries. Of the 45,000 tons of coal produced per month at Reels Cove and Whitwell mines, about 25,000 tons is captive. The remainder is sold in domestic and steam markets. Some coal is purchased. Coke production of about 22,000 tons per month requires about 33,000 tons of raw coal. Outlets for the coke have been the two company blast furnaces, sales to the Alcoa aluminum plant and sales to foundry, metallurgical and domestic users.

Whitwell is in the Sequatchie River Valley between Waldens Ridge and the Cumberland Plateau. Through this valley runs the Nashville, Chattanooga & St. Louis Ry., which serves Whitwell and Reels Cove mines. To reach the site of the Reels Cove tipple the coal company built 2.6 miles of railroad, including 6.8 miles of track, all of which has been taken over by the railroad company. The name "Reel" has been corrupted from "Rheal," after Dr. George Rheal, who settled in the region over 100 years ago as the first practicing physician. Even the names derived from the river have suffered changes of spelling. For instance, power for the two mines is purchased from the Sequachee Valley Electric Corp. which obtains it from the T.V.A. The tracts of the two mines lie along the edge of the Cumberland Plateau, which for the most part has an elevation of 2,000 to 2,500 ft.

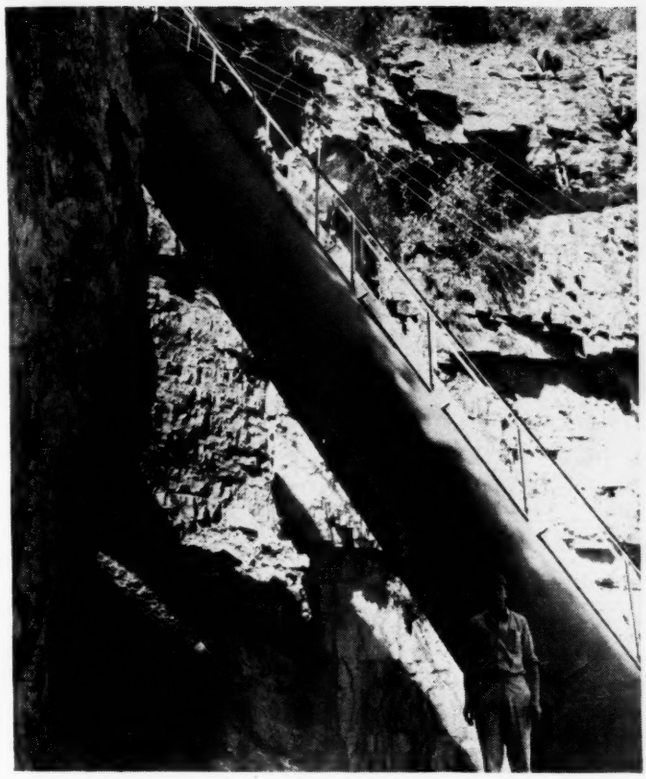
Tipple 830 ft. Below Opening

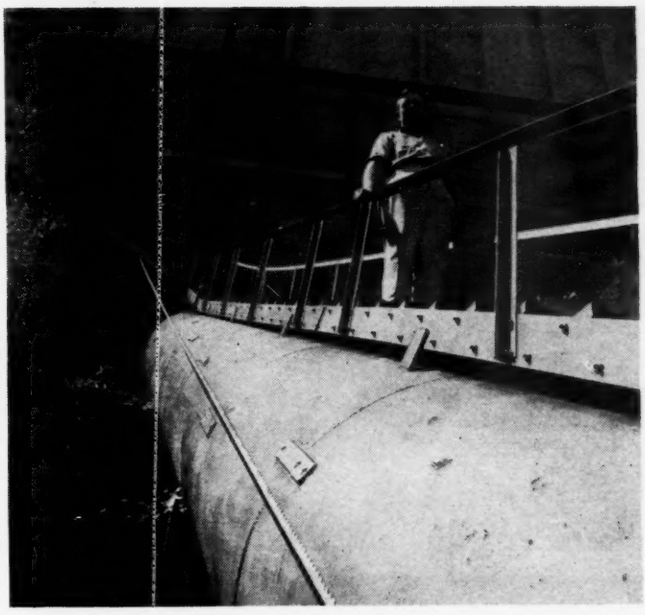
The pit mouth of the Reels Cove opening in the Sewanee seam is 1,730 ft. above sea level and 830 ft. above the railroad tracks at the new tipple. Considerable search for a good location, ingenuity and unusual design enabled the engineers to install a conveyor system for the 830-ft. lowering job without doing any rock work, this in spite of a 150-ft. cliff just below seam level.

The coal is conducted down through an opening in this cliff by a 5-ft. steel tube from the bottom of the mine-car dump hopper to a rope-and-button conveyor 800 ft. long. From the foot of this conveyor the coal is transported to a surge bin at the tipple by two retarding belt conveyors, each 1,000 ft. long. Capacity of the mine-car dump hopper is 1,200 tons. Part of the steel tube is installed on an inclination of 39 deg. from the horizontal and the remainder on 57 deg. A steel stairway on top of this tube provides access to the rope-and-button drive.

The two mountainside belt conveyors are 42 in. wide and the third belt conveyor, from surge bin to tipple, is 36 in. The tipple has two 42-in. belt loading booms. All these conveyors are built with Stearns-Rex idlers and are equipped with Manhattan "Master Conveyor" belting.

Feeders from the end of the 5-ft. tube to the rope-and-button conveyor, and





Thirty-nine degree section of the 5-ft. steel tube leading down from the bottom of the 1,200-ton mine-car dump hopper.

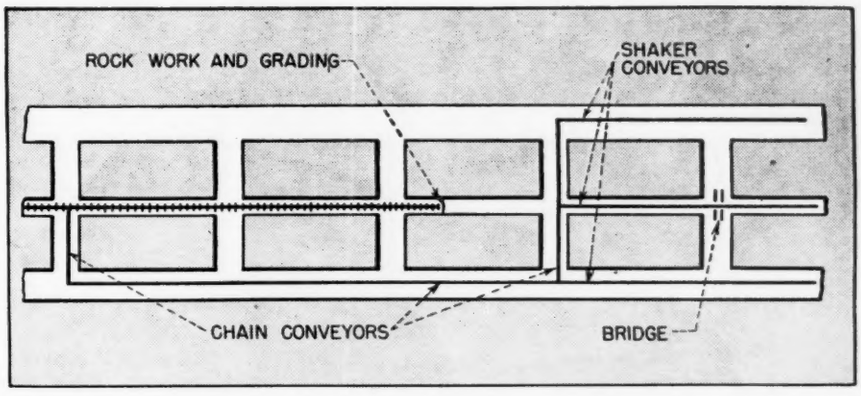
Fifty-seven degree section of the 5-ft. steel tube. George W. McCaa, superintendent, is standing on the roof that houses the rope-and-button conveyor drive.

from the 100-ton surge bin to the tipple feeder belt, are Jeffrey-Traylor Type 5 electric vibrators. The rope-and-button conveyor, using 12-in. Jeffrey buttons, a Jeffrey adjustable-rim flexible-toothed sheave and 1,600 ft. of 1¼-in. Wickwire Spencer "Grey-Strand" IWRC rope, 6x19 alternate lay, was designed by Messrs. Barnard and McFarlin.

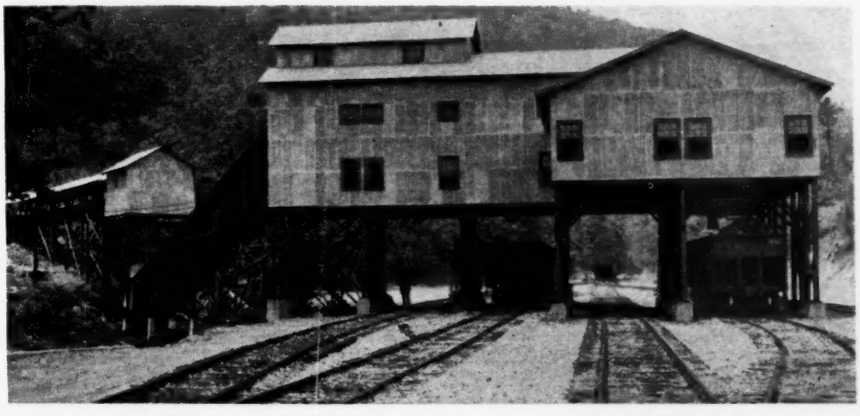
Tipple Rated at 400 Tons

The tipple, designed by the same men, has four loading tracks and a passing track and can screen all grades from 1¼x0 in. to 6 in. The shaker screen, of Barnard and McFarlin manufacture, is 8 ft. wide and arranged in two accurately balanced sections. Belt booms have picking-table sections. A double-roll Barnard-designed lump crusher is included in the tipple equipment. Loading chutes to the slack and nut tracks are inverted Y-type units permitting railroad cars to be shifted without stopping the flow of coal. Although rated at 400 tons per hour, this plant has handled 480 tons successfully.

Only six men are required to operate the entire conveyor line and tipple. Of these, one man walks up to the upper vibrating feeder and then patrols the rope-and-button conveyor and belts. Three men handle the railroad cars, one taking the loaded cars down over the scale and weighing them, another bringing down the empties, and the third trimming. At the time of this writing,



The main entry is developed by hand loading the coal onto shakers and then taking the top and/or bottom rock for height and grading with a track-mounted mobile loader.

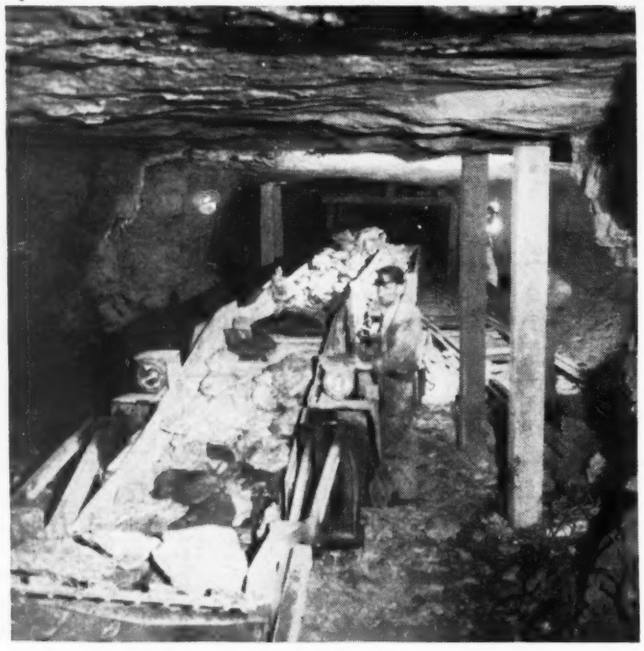


Reels Cove tipple is rated at 350 tons per hour. It has a 100-ton surge bin, screening equipment for all grades from 1¼ x 0 to 6 in., a crusher, two loading booms and four tracks.





Shortwall on a caterpillar truck crossing the haulage-entry shaker conveyor in main-entry development work (above left).



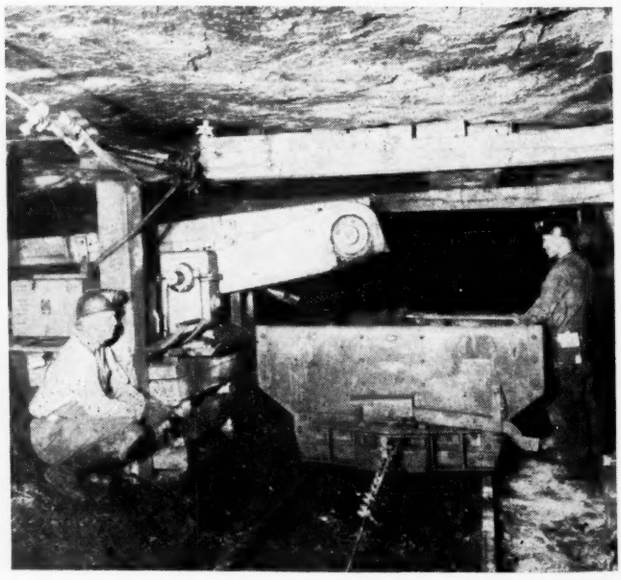
Preparing to shoot down a cut at the face of a room. Normal thickness of the coal is 39 in. (above right).

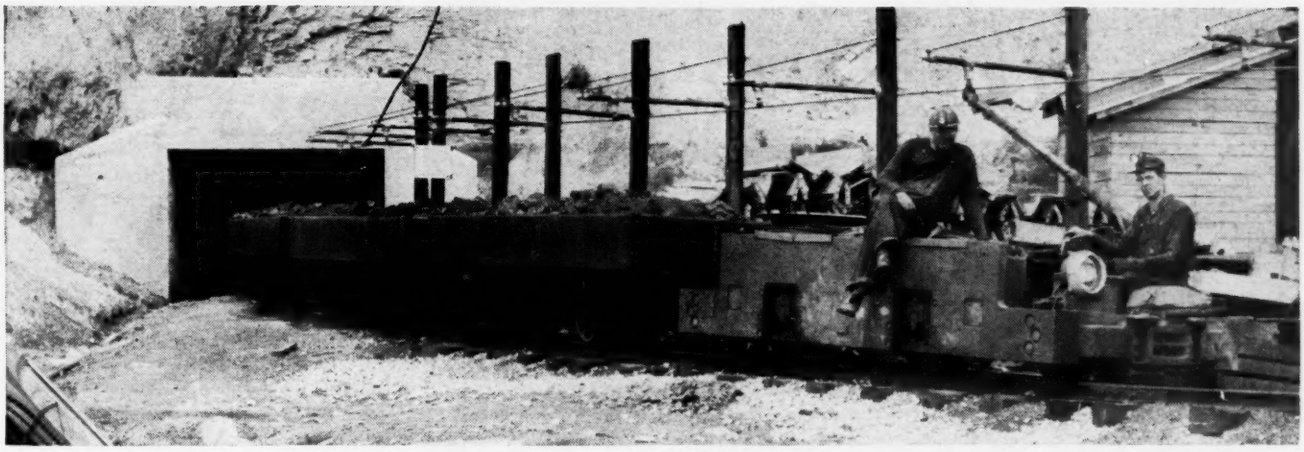
Loading rock shot from the bottom on the haulage heading of the main entry (left center).

Belt conveyor loading into a trip of 4½-ton drop-bottom cars. Two belt sections are being worked in the mine. Four room conveyors and three heading-development conveyors discharge to each belt. When this photograph was made the belt was 500 ft. long. Ultimate length will be 2,000 ft. (below left).

Cross conveyor loading to 4½-ton cars in main-entry development. George W. McCaa, superintendent, chats with boom man Arthur Smith (below right).







The 8-ton cable-reel locomotive bringing out a trip of 4½-ton drop-bottom cars. This main portal is 400 ft. from the headhouse.

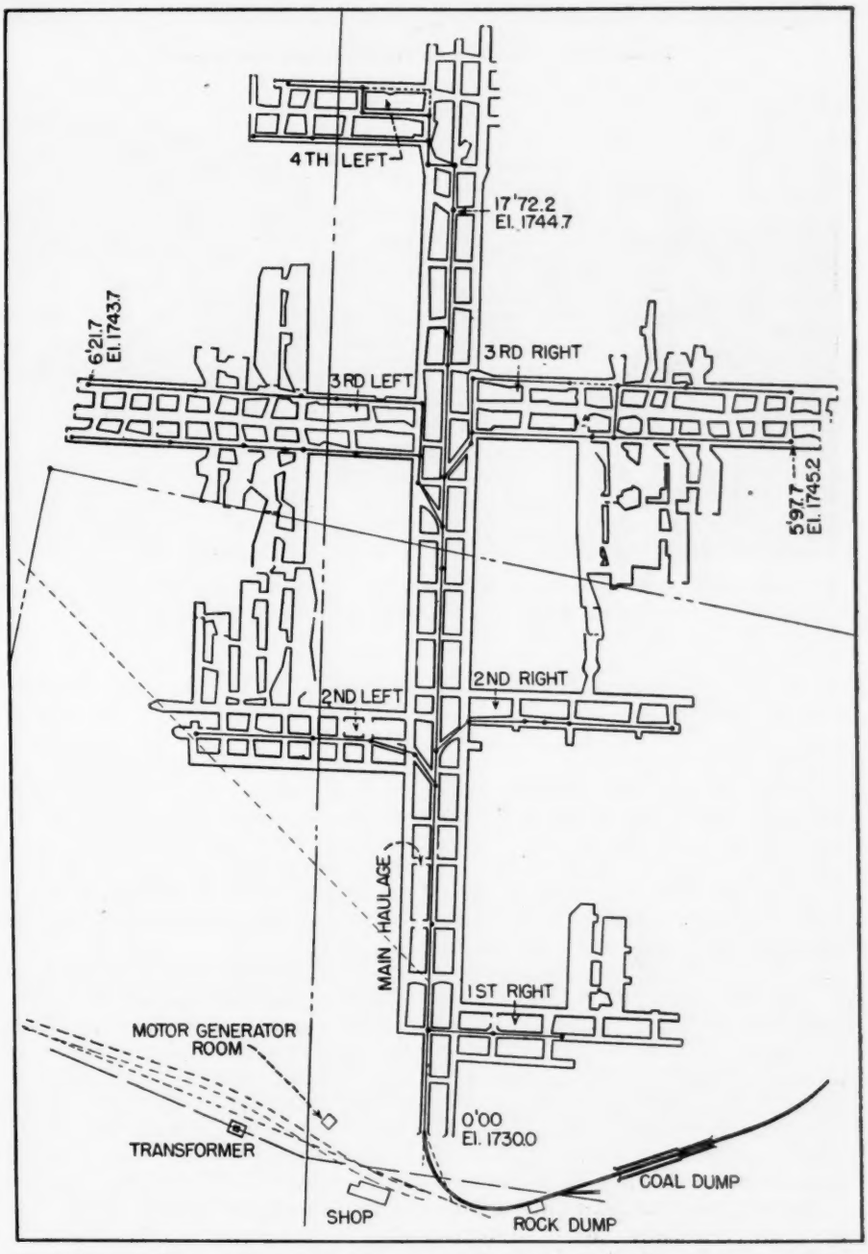
when daily production, largely from development, was 350 tons, storage in the hopper, surge bin and mine cars was sufficient so that the tipple was being operated but two days per week and the six men were borrowed from underground as needed.

When running domestic coal from the mine the 5-ft. tube is kept filled to minimize breakage. While running captive tonnage, however, the tube is allowed to run empty, or nearly so, to get as much breakage as possible.

The tipple has eight 220-volt motors ranging from 2 to 30 hp. Three identical and interchangeable 50-hp. 440-volt General Electric motors, General Electric Thrustor brakes and Jones speed reducers operate the three mountainside conveyors. Tipple power is furnished by three Westinghouse 50-kva. 2,300/220-volt transformers. One pair of transformers of the same make and size furnish 440 volts to one belt conveyor and three others (also identical) supply the rope-and-button motor and the other belt conveyor. Still another identical pair supply 220 volts to the vibrator at the top of the rope-and-button conveyor and to the shop.

Seam Nearly Level

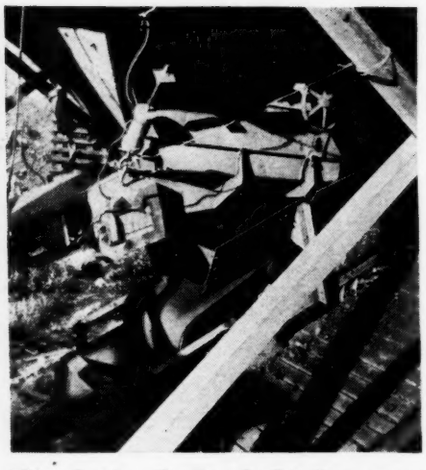
The coal seam lies nearly level, is without pronounced local dips and does not give off any methane. Two thousand feet in from the portal the main entry has gained 14 ft. in elevation. The normal roof, a mixture of sandstone and slate, usually is strong and reliable. Draw rock is encountered in some places and must be closely timbered or taken down. Rolls or horsebacks also are encountered. In some instances they can be timbered. Usually, however, they must be taken down. Near the outcrop "mountain breaks" sometimes are encountered and result in "heavy top." The bottom is a hard fireclay or slate. Usual range of coal thickness is 30 to



Reels Cove workings with the main entry in 2,000 ft. and the two belt panels working and developing.



Loading onto a shaker conveyor in entry development.



This electric vibrating feeder from surge bin to tipple elevating conveyor is a duplicate of the one from the 5-ft. tube to the rope-and-button conveyor.

The 1x0-in. coal from Reels Cove can be washed in transit at this Whitwell preparation plant, which has jigs and tables. Thickener in foreground.

45 in. The panels are mined advancing and the work is now under 200 ft. of cover. Maximum over the property is 275 ft.

In driving the triple-heading main entry, the center one of which has the top rock taken to provide 6 ft. of clearance (top of rail to trolley wire) for mine-car haulage, the coal is hand loaded onto three La-Del U-17 shaker conveyors, delivering to a La-Del FF cross chain, which in turn delivers to a La-Del FW chain 300 ft. long on the right-hand aircourse. Another La-Del FW cross conveyor 50 ft. long carries the coal over to the center, or haulage, heading. Three mining machines without cats handle this work. The first 300-ft. section of each belt panel entry is driven in the coal in a like manner.

Bottom grading in 270-ft. lifts is done by a Myers-Whaley No. 3 Automat loading directly into the 4½-ton mine cars, without interfering with the development in the coal. Air for drilling the rock is supplied by an Ingersoll-Rand 120-c.f.m. low-vein portable compressor. Water to suppress dust when drilling is supplied from a car attached to the compressor truck, which also serves as a tool car. The Whaley also is used in grading sidetracks. Headings to be graded for track are 10 ft. wide and the aircourses and headings for belts are 20 ft.

Two belt panels are being worked advancing. The triple-heading entry for a panel is driven, after the first 300 ft., by conveyors discharging to the end of the belt, while room conveyors discharge to that same belt at points outby. Equipment for a panel consists of a La-Del belt discharge station, a La-Del MTB belt conveyor 2,000 ft. long equipped with Manhattan Master 26-in. 5-ply 42-oz. duck belting, four La-Del FA 300-ft. chain-type room conveyors, four La-Del FF 40-ft. room face conveyors, three Goodman E 11-70 shaker conveyors with 90-deg. turns (for heading driving), two La-Del FF chain cross conveyors, four shortwall mining machines for rooms, one shortwall with Joy T 2 caterpillar truck for the three headings, five Chicago Pneumatic No. 571 electric coal drills using Coalmaster augers and bits and one Brownie HKL car-spotting hoist.

Equipment in Use

The ten shortwalls include two Goodman 12AA, six Goodman 212AA and two Jeffrey No. 3520 machines. Cutter bars are 6 to 7½ ft. long and all use standard bits tipped with tube boron.

Some variation from the standard conveyors enumerated above exist. For instance, one heading of one belt panel is worked with a La-Del U17 shaker conveyor. A La-Del shaker also is being used in one room instead of a chain. Rooms are driven 45 ft. wide on 55-ft. centers and are 300 ft. deep, measured from the belt. The plan calls for a change later to 75-ft. rooms on 100-ft. centers.

Shooting is done with permissible explosive detonated with No. 6 electric blasting caps using 10-ft. copper leg wires and fired by 10-shot Eveready permissible X247 dry-cell batteries.

Power at 275 volts d.c. is carried into the belt entry by a pair of No. 4/0 cables (one positive and one negative) on each aircourse (right and left). Each pair feeds the conveyors and face equipment on its side. One pair is extended to serve the development equipment beyond the end of the belt. A belt is installed with an initial length of 300 ft. and is extended to 2,000 ft., which is the panel length.

Ohio Brass junction boxes are used at

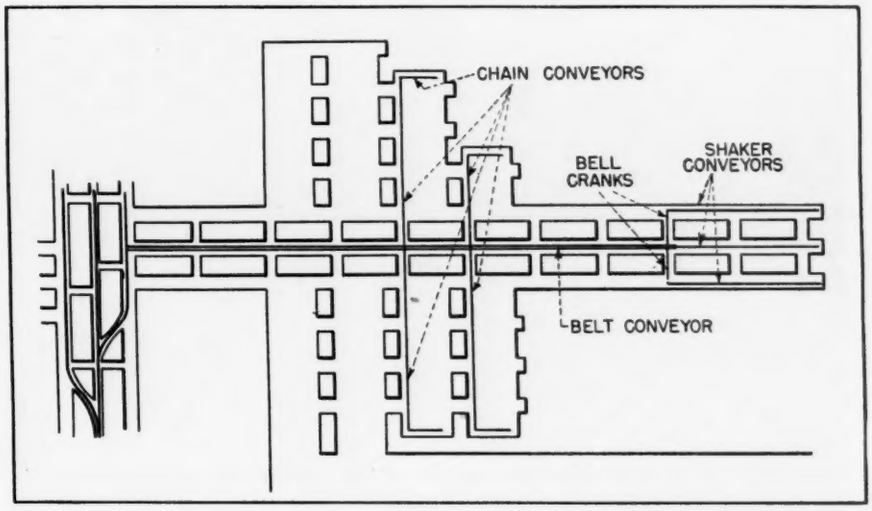
the room faces. KAD starters of the same make, together with reversing switches, are mounted on sleds made from standard pipe. These are built with runners 6 in. high so that ordinary chunks of rock are not caught and dragged ahead when moving the unit. An electrical interlocking system stops all chain and shaker conveyors inby if the belt stops and likewise prevents their operation if the belt is reversed for carrying supplies.

One-Shift Operation

At present, with 71 men on the payroll, the mine is operated one shift and the tipple two days per week. Although the work includes handling a lot of rock for developing the main entry, the coal production is 5.1 tons per manshift (monthly average for all employed).

So that the one shortwall machine with caterpillar truck may do the cutting for the three headings in main-entry development, a crossing must be provided over the shaker-pan line in the center heading. The wooden bridge for that purpose is made up of four identical sections that are easy to move from one breakthrough to another. Each section consists of a ramp made up of two 3x8-in. planks 10 ft. long, set side by side and elevated at the conveyor end by being spiked to a 6x8x24-in. block. No cover is needed over the pan line. The caterpillar treads clear it by a half inch or so.

Air is conducted to the room faces by line brattices from the last breakthrough. Belts load to sidetracks holding ten cars. The tracks, 42-in. gage, are made up of 60-lb. rails set on 6x8-in.x6½-ft. creosoted ties and use No. 4 turnouts. Timbering on the main line, as needed, consists of



Advancing belt panel at Reels Cove. Rooms are hand loaded onto chain conveyors and headings onto shakers.

6x8-in.x12-ft. cross collars on 8x8-in. legs.

Supplies for belt sections are taken in on the belt by the night-shift grading crew and later moved from the belt to the face by a handy man on each section. He reverses chain conveyors and where shakers are installed uses a small truck running in the pan line.

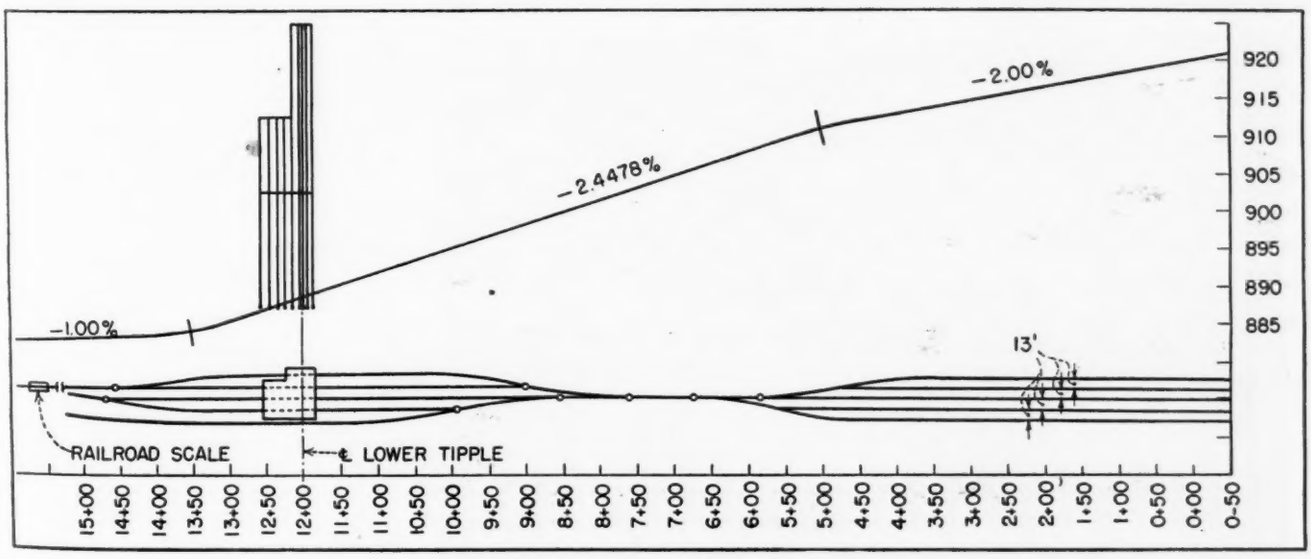
Car equipment consists of 50 Sanford-Day automatic 1-2-3 drop-bottom cars with a capacity of 4½ tons conveyor loaded. Wheels are 14 in. in diameter with Timken bearings, wheelbase is 46 in., body height is 39 in., and the couplings are single-link. The cars are without brakes. On each end is a pair of cat-eye reflector buttons set in rubber.

The locomotive serving at present is a new Jeffrey 8-ton MH100 unit with cable reel. The outside haul from portal to car-dumping hopper is but 400 ft.

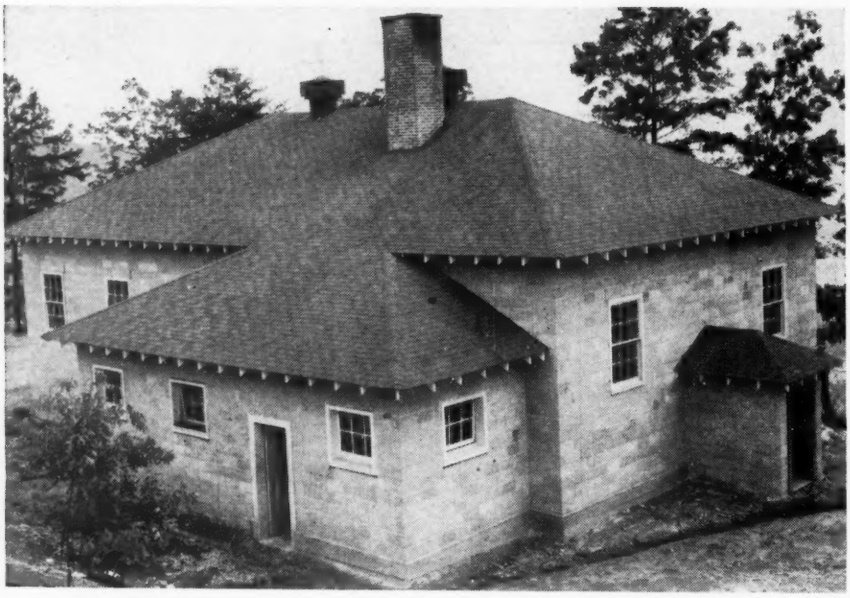
Three pumps are in use in the mine. Two are La Bour self-priming centrifugal units and the other is a Myers piston pump. They are operated by 3- and 5-hp. motors.

Slate and rock from the mine is dumped from the drop-bottom cars into a pit on the outside haulage road between the portal and tipple. From this pit the refuse runs by gravity down a steel chute 75 ft. long to the edge of the rock cliff, from which it plunges 150 ft. to the mountainside. The space available assures that this practically costless disposal will serve the mine for 15 or 20 years.

Cap-lamp equipment consists of 120 M.S.A. Model P Edison lamps. Post-office type window service has been provided for them in the lamphouse at one end of a permanent building near the portal, which also serves for the repair



Tipple and empty tracks serving Reels Cove mine.



This 33 x 60-ft. bathhouse with a 10 x 30-ft. wing has 250 clothes hangers for miners and a separate locker and dressing room for supervisors.





In a room adjoining the company store this sandwich shop, equipped with modern electrical cooking equipment, is a real service to the community.

The company's well-stocked and inviting store at Whitwell competes successfully with several stores nearby.

shop, supply room and mine office.

The purchased power is metered at a point central to Reels Cove and Whitwell mines. Transmission from this point to the mines over lines owned and maintained by the coal company is at 11,500 volts. At Reels Cove the voltage is changed to 2,300 for local distribution by three Westinghouse 300-kva. transformers. Direct current is generated by a General Electric 150-kw. motor-generator set, a reconditioned unit installed outside near the portal.

Modern Bathhouse Built

Two hundred and fifty clothes-hanger chains and baskets are provided in a modern bathhouse 33x60 ft. with a 10x30-ft. wing for the fuel bin and toilets. This bathhouse is close to the portal and lamphouse and is constructed of concrete blocks, with a height to the eaves of 18 ft. The bath water and building are heated by a stoker-fired furnace installed in the entrance hall to the building. Bosses have a dressing and locker room 10 ft. wide across one end of the building. No separate room is provided for colored workers and at present none is employed at the mine. The floor plan of this bathhouse appeared in the February *Coal Age*, p. 128.

Labor costs in daily operation at Reels Cove mine, where George W. McCaa, a graduate of Lafayette College with a wide experience in coal mining, is superintendent, are summarized on a form under eight items: "Conveyor Production," "Conveyor Moving," "Conveyor Rock Work, Etc." (with a line for the conveyor item totals), "General Inside," "Rock Yardage Development," "Tipple Labor" and "Repair & Maintenance Labor" (then a line for total labor including conveyor items). Material is divided into "Mine Supplies" and "Repair & Maintenance Supplies." The report form, which includes spaces for fixed-charge items, tonnage and days worked, is shown on p. 114.

E. C. Mullins was resident engineer on the job during construction of the new plant. Robert Reeves is mine foreman and Hugh Barker is chief electrician.

H. A. Daffron is superintendent at



Officials and guests gathered at the approach to the headhouse dump bin during the formal opening May 30, 1945.

Whitwell mine. The field or operating office for the two mines is located here along with a commissary and sandwich shop with modern fixtures, which enjoy an excellent trade even though in competition with stores and restaurants in Whitwell less than a half mile away.

The preparation plant at Whitwell, now serving as a central washing plant for the 1x0-in. coal of both mines, has Elmore jigs and Deister Plat-O tables. The fines are separated from the wash water in a Dorr thickener.



Carl McFarlin (seated, center), president of the Tennessee Products Corp., enjoying the food at the barbecue and fish fry at the formal opening of Reels Cove.

Reels Cove mine was formally opened May 30, 1945, when company officials, associates and a number of invited guests had a look at the mine and then assembled at Whitwell for a barbecue and fish dinner. Guests from a distance included C. E. Abbott, vice president, Tennessee Coal, Iron & R.R. Co.; Arthur J. Blair, geologist for the land division of the company; and Howard J. Thomas, Solid Fuels Administration, all of Birmingham. Mr. McFarlin, the recipient of a handsome pen and pencil set from the supervisory force, heard himself eulogized as possessing wonderful skill and ingenuity, and being "a swell fellow." Mr. McFarlin's office is at Nashville. L. A. Miller is vice president in charge of production. Alvin Foster also is a vice president; Hampton Lackey, treasurer; J. P. Beattie, secretary, and Eugene Russell, counselor. W. B. Stevens is acting purchasing agent and editor of the company's house organ —the *Tennessee Products News*.

Reels Cove portal and headhouse is but two miles off the paved State road, No. 108. The company has graded and rock-surfaced this two-mile link with the state road. Highway distance from Chattanooga to the mine portal is 28.6 miles.

MAGNETIC SEPARATORS

Solve Tramp-Iron Problem in Preparation

Preparation Equipment and Consumers' Stokers Protected by Removing Tramp Iron From Coal—Metal Salvage an Added Advantage in the Use of Magnetic Separators—Iron Detector Also Available for Protection

By E. H. NEYMAN
Sales Manager,
Dings Magnetic Separator Co.

THE INCREASING USE of magnetic separators to remove tramp iron in coal processing warrants a study of the various types of separators and their applications, together with the need for installing them.

The use of magnets in a growing number of preparation plants is an outgrowth of many things. The manpower shortage, for example, means that a greater number of mines cut and load coal mechanically, thus increasing the sources of tramp iron while decreasing the opportunity of detecting it. Decreased manpower, of course, means more work for fewer men and more chance for carelessness and negligence. Frequently, men coming out of a mine will place tools or a box of bits on a coal car. Then, during the time the car starts from the mine face and goes through various switching and gathering operations until it is hoisted at the shaft, the tools are forgotten and are dumped with the coal.

The increasing number of coal stokers being installed in homes has increased the need for protection against tramp iron. News of costly damage suits has convinced many tipple operators that magnetic separators offer the best kind of insurance. Locomotive stokers are susceptible to tramp-iron damage also, and must be protected from the offending metal.

An advantage of magnetic separators not generally considered is that they may be used to salvage valuable scrap and re-usable parts. One plant manager in Pennsylvania puts it this way: "While we always have to think of the customer, the fact remains that in two years we saved enough tramp iron to more than pay for the magnet, plus the fact that if we don't get the iron out of the coal it can do a lot of damage to our machinery." Cutter bits, for example, are worth 3 to 7c. each and the setscrews that hold them in the cutter chain cost about 23c.—just two of many items that quickly add up to larger figures.

One of the most important reasons why magnetic separators are necessary in coal-preparation plants is the damage tramp iron can do to the machinery—most frequently to crushers, grinders and pulverizers. Many types of iron capable of causing such trouble find their way into the coal, including cutter bits, chain links, jumper rails, mine-car couplings, rivets, mine spikes, tools and drills.

Raw-coal plants comprise about 77 percent of all plants in operation and here magnetic separators are essential to protect stoker coal, middlings and refuse crushers from tramp iron. The remaining 23 percent are washing plants (using both wet and pneumatic methods). It is asserted by some operators of such plants that they have no need for separators because their primary crushers have large, widely spaced teeth that will not mesh on tramp iron; also, that the iron is discarded in the cleaning process before it can reach secondary close-meshed crusher or pulverizer teeth.

While it is true that small pieces of iron may slip through a primary crusher, there are many records of such machines being wrecked by iron of larger size. Then, too, without a magnetic separator, salvageable iron is lost in the washer refuse. Conceivably, a comparatively small magnetic-pulley separator could be used on the narrow refuse conveyor belt solely to reclaim iron, but a larger pulley on the coal-conveyor belt ahead of the primary crusher also would pay protective dividends. One operator of a wet plant employs a magnet on the end of a pole to salvage iron from refuse in the bottom of a jig. However, a magnet ahead of the primary crusher would both protect it and salvage valuable metal as well.

The most common type of separator used in coal-preparation plants today is the magnetic pulley installed as a head pulley at the discharge end of a belt conveyor. As illustrated in Fig. 1, iron

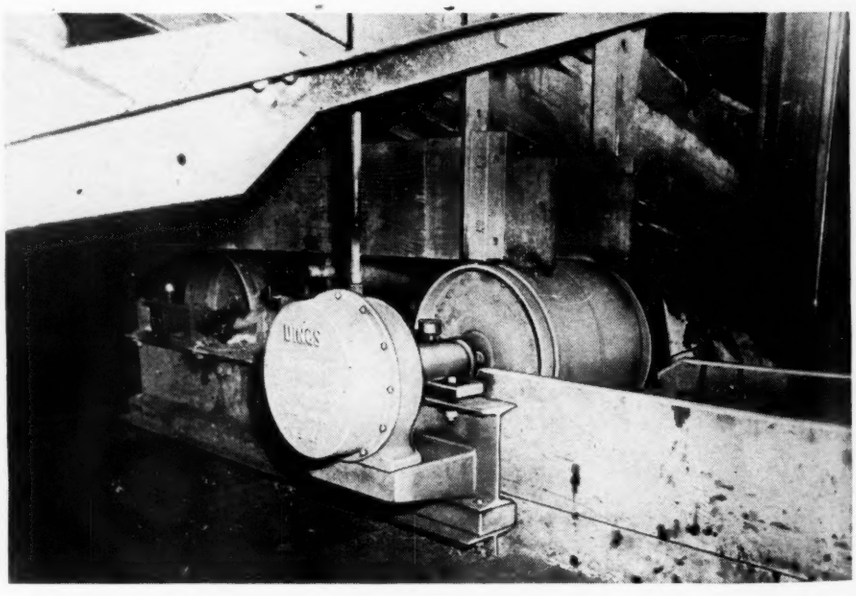


Fig. 1—Magnetic pulley-type separator installed as a head pulley in a belt-conveyor system.

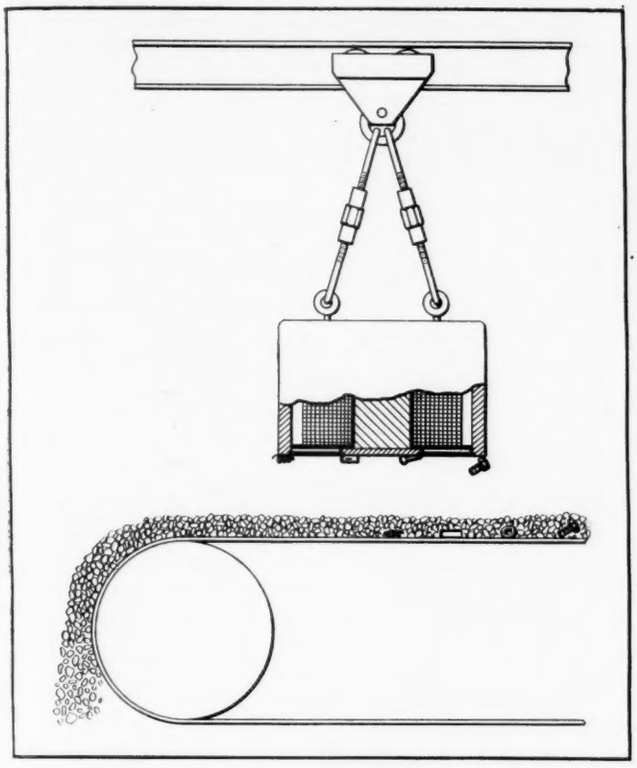


Fig. 2—Double-gap rectangular suspended magnet installed above and parallel to the belt.

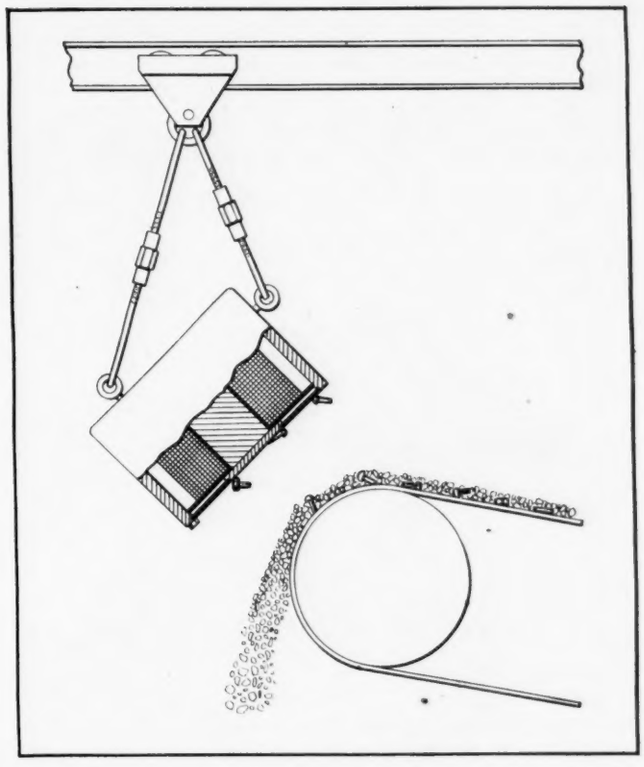


Fig. 3—Same type of magnet shown in Fig. 2 installed parallel with the path of the material.

is attracted by the pulley and held to the conveyor belt until it passes underneath and beyond the magnetic zone, where it is automatically discarded. Coal passes over the pulley unhindered.

Since heat generated by the coils of a pulley will, if not dissipated, reduce its magnetic strength, air-cooled pulleys are recommended for maximum efficiency. Such separators have ducts running radially and longitudinally through the pulley. The large areas of the heat radiating surfaces plus forced air circulation (created by the belt and rotation of the pulley) reduce operating temperatures and increase the power to remove iron. Also recommended are pulleys having bronze coil covers and end rings. Bronze coil covers permit greater emanation of flux away from the face of the pulley, thus increasing the attraction for iron at the top of burden. Bronze coil covers, too, will give years of service.

Magnetic pulleys are simple to install and require little wiring. Pulley shafts usually can be machined to the shaft dimensions of the standard head pulley being replaced, so that existing bearings may continue to be used. This type of separator operates on direct current,

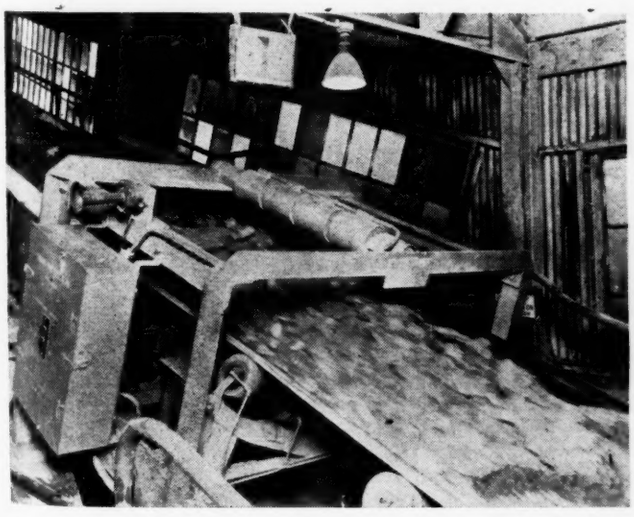


Fig. 4—Tramp-iron detector that signals the presence of iron in coal on conveyor belt.

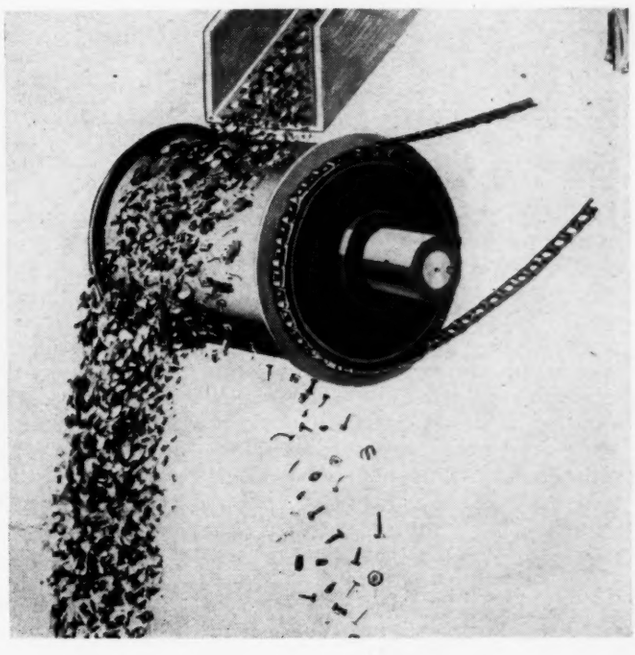


Fig. 5—Magnetic drum for installation at the bottoms of coal chutes.

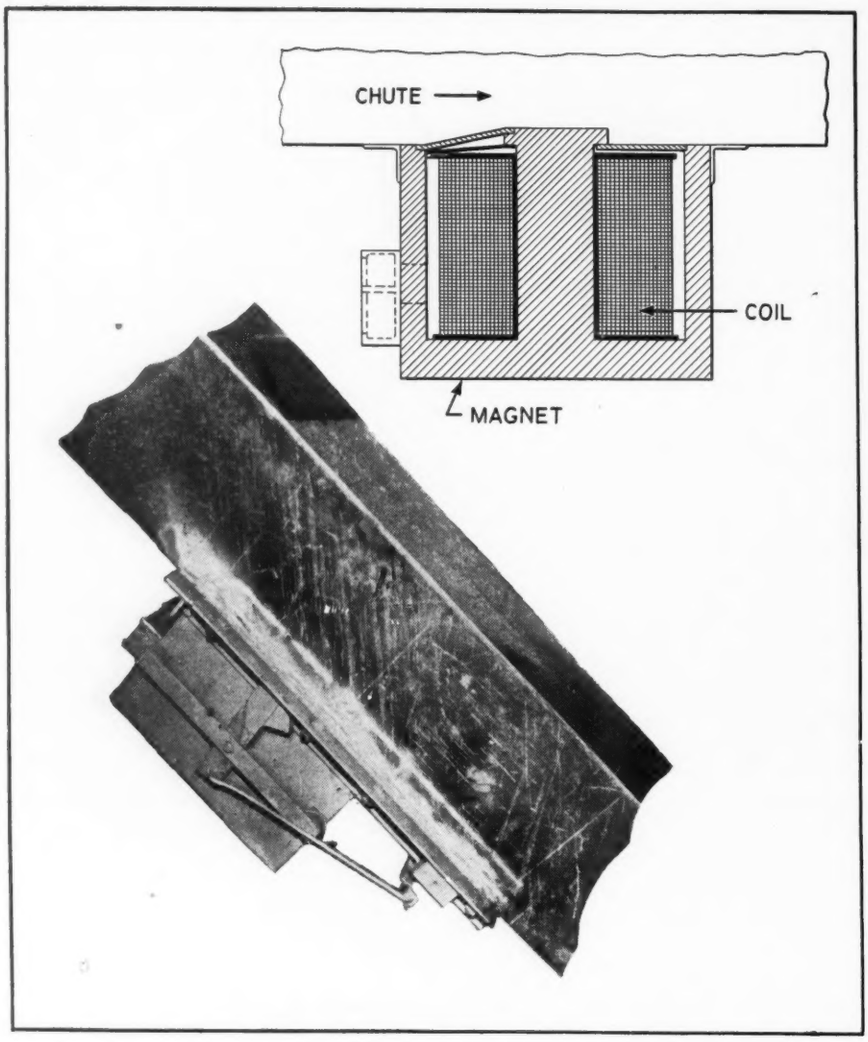


Fig. 6—Double-gap spout magnet with automatic safety gate.

treating coal for as little as 2½c. per hour per 200 tons. Where only alternating current is available, a rectifier or motor-generator set may be employed to provide direct current for the magnetic coils.

Suspension magnets also have their place in coal-preparation plants, but it must be remembered that non-automatic operation and the ever-present possibility of a power interruption, causing the tramp iron to drop back on the conveyor belt, make them less efficient than magnetic pulleys. However, if use of a magnetic pulley is impractical or undesirable, suspension magnets may be used safely with interlocking a.c.-d.c. controls. Then, in the event of a d.c. power failure, the conveyor drive motor is turned off automatically and tramp iron is kept from being processed with the coal.

Figs. 2 and 3 show two methods of installing rectangular suspended magnets. The position of the magnet above the head pulley generally is preferred to that paralleling the conveyor belt, since there is less chance that long pieces of iron will be lifted on one end, causing the other end to jab into and rip the conveyor belt.

Suspension magnets often are less practical than magnetic pulleys because large lumps of coal may prevent placing the magnet sufficiently close to the belt. Conversely, magnetic pulleys are less effective when the depth of coal being conveyed is too great. One solution is to spread the coal over a wider belt, but where that is not possible and the lumps are large, a suspension magnet can be placed above and somewhat ahead of a magnetic pulley.

Comparing the two types of separators again, the suspension magnet must overcome the momentum of the moving iron while lifting it through the coal and the air gap between magnet and belt, whereas the magnetic pulley has the advantage of more direct contact and of working with the help of gravity.

A new type of machine protection is available through the magnetic iron detector illustrated in Fig. 4. While this device does not separate iron from the coal, it is widely adjustable for complete tramp-iron detection while permitting passage of the smaller ferrous material at a weaker setting. The detector can be set either to stop the belt or actuate an alarm. It has no tubes or mechanisms to get out of order and is not affected by the outside influence of magnets or other electrical devices. Where non-magnetic manganese dipper teeth or other tools are a cause of trouble, steel inserts can be placed with the manganese steel and the entire piece detected. A magnetic drum, illustrated in Fig. 5, is designed for use at the bottom of a chute or in other places where a conveyor belt is not employed. Like a magnetic pulley, it is continuously and automatically self-cleaning. The machine consists of a stationary magnet around which revolves a cylindrical shell. Since the magnetic lines of force extend only half way around the drum, tramp iron is discharged automatically from the under side of the shell after being separated from the free-falling coal. Little power is required to drive a magnetic drum since only the shell revolves, and replacements because of natural wear generally are limited to the shell. This type of separator is in common use in preparation plants and is very efficient, but it is not recommended for the treatment of wet coal, which has a tendency to pile up on the drum.

Inclined Installations

The spout magnet illustrated in Fig. 6 is a double-gap model designed for installation on the under side of inclined coal chutes or spouts. Iron passing over the magnet collects below an offset in the face, where it is securely held until the energizing current is interrupted. An automatic safety gate has been developed recently as an optional feature. It facilitates discharge of accumulated tramp iron and prevents its escape in the event of accidental power failure. Where direct current is not available this type of separator also may be operated with an electronic-tube-type rectifier or motor-generator set.

The need for magnetic protection of some type against tramp iron is becoming increasingly apparent to operators of coal-preparation plants. Separators or detectors avoid damage to plant machinery as well as to customers' stokers, thus obviating expensive shutdowns, repairs or replacements, lawsuits and loss of customer good will. In addition, an extra source of profit is provided through the salvaging of scrap or reusable iron parts. A complete investigation of possible applications should pay dividends to any operator.

BELT HOISTS

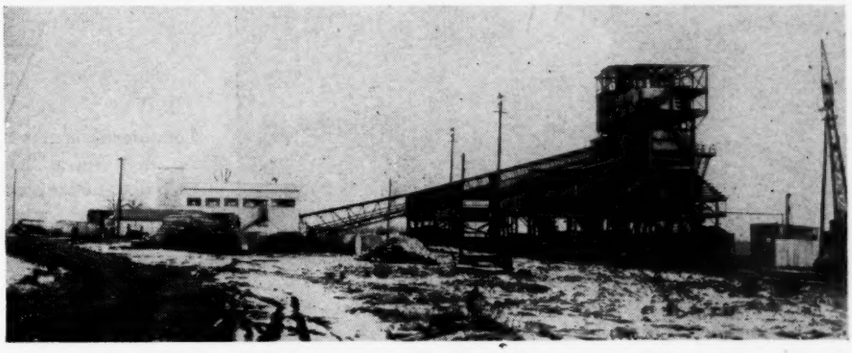
Handle Coal Smoothly and Economically

Belt Advantages and Economies in Mechanized Sinking Favor Growth of Belt Hoists—Tandem Installations Go Into Longer Slopes With New Steel-Cable Belts Promising Increased Reach for Single Units

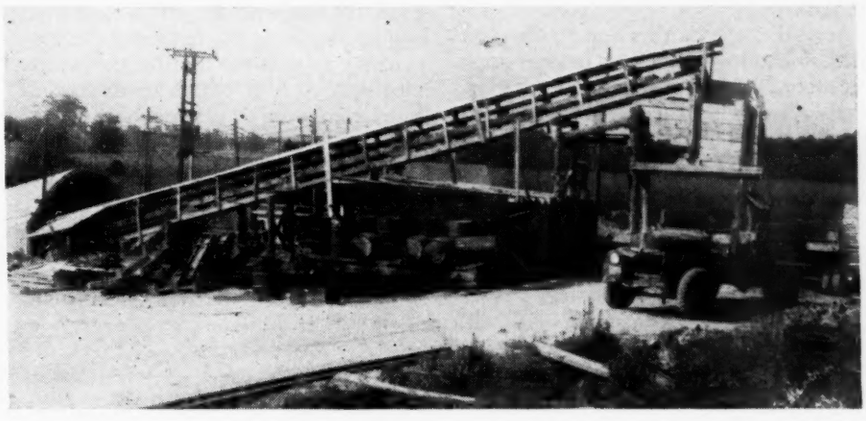
NEW FASHIONS are as important to coal mines as Paris models are to ladies' apparel—when they pay off. There is no near competition to belt hoists, where they can be employed, in power consumption, simplicity of operation, steady feed to the preparation plant and a minimum of brainstorms. The use of rubber belts for hoisting coal has become a major development in just a few years. One belt hoist leads to others. There are numerous reasons for that popularity. Some pointed out by two experienced operators are:

1. The cost of sinking a slope often is less than that of a vertical shaft although its length is approximately four times that of the latter. In explanation, slope sinking may be a mechanized process under most conditions while shaft sinking is largely a hand process. The extent mechanization is employed determines the relative cost.
2. Slopes are easier to inspect and far safer to sink and operate.
3. There is no limit, within reason, to output; 20 percent added to belt width increases capacity 50 percent.
4. Elimination of caging reduces labor and cuts accidents.
5. Even flow of coal to the preparation plant reduces operating troubles and improves quality.
6. A complete modern belt hoist costs no more than a modern cage or skip hoist.
7. Operation is smooth and noiseless.
8. Power cost is much less than for a cage or skip hoist.
9. Without interfering with hoisting, material may be lowered into the mine by means of a track and car in the same opening.
10. The slight bend at the foot of a 15-deg. slope is less disturbing to air currents than the square turn at the foot of a vertical shaft.

This array of advantages adds up to a material saving in cost per ton where belts can be employed, in addition to reducing operating troubles and increasing tonnage per man-day. Noiseless operation aids in the prompt location of trouble and permits immediate recognition of danger signals.



Preparation plant with inclosure designed for belt hoisting. The building at the left stands on top of the slope mouth and houses the man-and-material electric hoist in the second story.

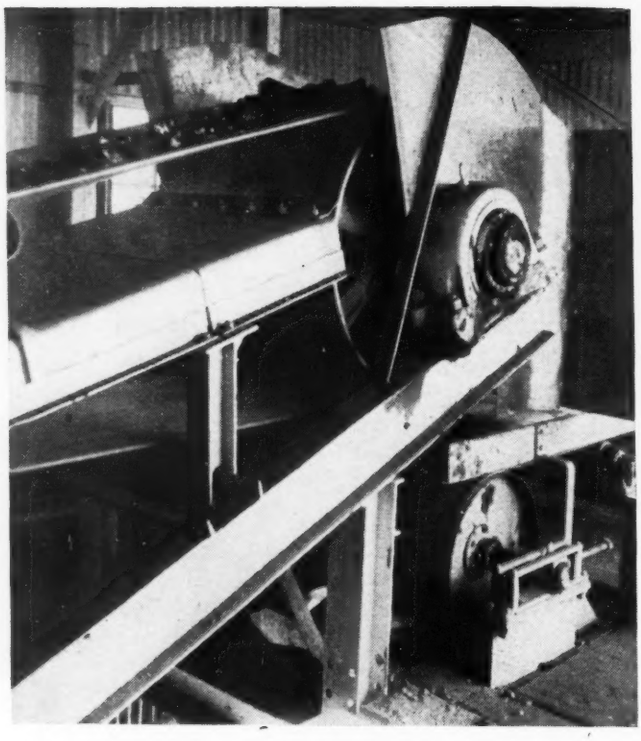


View of temporary belt and small storage bin used for sinking only. A chain conveyor down at the face discharges onto the belt.

One great advantage of the belt hoist is that it is easy to provide a surge bin ahead of the belt at the point of coal delivery on the bottom. This bin receives the irregular supply of coal from the face and passes it on to the preparation plant in an even flow throughout the day. Because of a continuous coal supply, conditions in the jigs are not upset—a factor in maintaining uniform analysis and quality of coal. An added advantage is a more uniform raw-coal consist to the preparation plant.

Some new users have had a tendency toward sinking the first slope as steep as permissible—17½ or 18 deg. It is true that a flatter slope requires a longer belt and more idler pulleys, but the increased horsepower to drive the slightly longer belt is negligible.

One company with a successful record of sinking eight slopes, after putting down the first at 16½ deg., has made 15 deg. the standard because a crawler loader may be more satisfactorily manipulated on the slightly reduced grade. There is another reason for limiting slope inclination—rollback and cascading of coal. These also are de-





Reinforced-concrete slope entrance. It extends 300 ft. to hard material and will be finished with a steel arch, grouted between the arch and the concrete, which will extend the full length of the slope.

Head pulley with shaft carried in spherically mounted roller bearings.

pendent on the shape and size and the quantity of fines contained in the coal mixture. One belt manufacturer recommends a limit of 16 deg. to prevent rollback.

Several methods of slope sinking are used, including a number in one slope because of ground variations at different levels. A dragline frequently is used to dig down to the hard material. At the slope location excavation is finished to slope grade, a concrete arch or other lining is installed to the surface level and the excavated dirt then filled back. The hard material is drilled and shot by customary methods and the gob is loaded into a car or truck or onto a belt for hoisting. After this part of the slope is completed it may be timbered or lined with concrete or a corrugated steel arch with concrete filling behind it. The concrete lining may be rectangular or arched. It always is reinforced with steel.

The excavated material usually is loaded mechanically onto a belt or other conveyor for delivery to the surface. Belts in such service usually are temporary because frequent extensions and splices are necessary. A chain conveyor may be used at the face to feed the belt because it easily is extended by short increments. This arrangement reduces belt cutting and splicing to standard lengths and belt extension to less frequent intervals.

Sinking usually is done on a continuous three-shift basis to minimize delays caused by water and to hasten completion of the job. Compressed air-driven pulsating pumps are said to handle the muddy water from sinking operations very successfully.

One company that has developed slope sinking into an art uses crawler loading mechines for handling the gob, a chain conveyor for feeding the rubber hoisting belt and trucks to dispose of the material on the surface. For one of their slopes the record was 780 linear feet in 41 three-shift working days.

Gasoline Trucks Hoist Gob

Other operators sinking slopes have made use of gasoline-powered trucks for hoisting the gob to the surface. An electric hoist lowers and raises the truck with a wire rope while the driver steers it in both directions. When the truck reaches the surface, it delivers the load to the dumping point under its own power, the hoisting rope remaining attached all the while. The ground in some coal fields may call for other methods.

The lower end of the slope usually is sunk well below the coal vein to provide a surge bin that, with a feeder to the hoist belt, converts the irregular flow of coal from the face to a uniform flow to the preparation plant. If the surge bin is large, it may be equipped with a shuttle belt to spread the coal and thus fill the bin to capacity.

One slope mine still in the development stage ultimately will have a surge bin holding 2,000 tons. This will provide for a half day of operation if the preparation plant breaks down or the car supply runs out. The construction of this surge bin offers several points of interest because of the method of excavating the gob and loading it out.

The hoisting belt already is in place under the ground to be excavated. A large hole has been drilled from the surface through the center of the proposed surge bin to a point into a crosscut from the slope and near one side. The excavated material will be shoveled down the drillhole and loaded on the belt with a coal-loading machine. The hole had to be drilled from the surface because the drilling rig could be set up only out in the open.

When tandem belts are used to negotiate a length not possible with one belt, slopes sometimes are offset vertically at the transfer point to raise the lower belt sufficiently to discharge onto the upper, thus maintaining identical degree of slope. An alternate that has been used is to increase the pitch of the lower belt enough to get the necessary discharge height at the transfer—perhaps one-third or one-half a degree.

At the date this material was prepared, one of the longest belt slopes to be put down—over 1,700 ft.—was nearing completion in Indiana. The vertical distance to coal is almost 500 ft. In this slope the concrete arch, now completed through the soft material, will be lined with a corrugated steel arch that will extend down to the coal. The voids behind the steel will be filled with cement grout. The present concrete arch was built by members of the sinking crew. A single

steel-cable belt is being considered for the permanent installation.

Coal may be brought to the bottom in drop-bottom cars or in solid-body cars to be dumped in a rotary unit. Since belts are becoming popular for haulage underground, coal may be delivered to the surge bin by that method. However, even when belt haulage is used, the coal supply is spotty and a surge bin is necessary to get best hoisting and preparation results. However, when only mine-run is loaded for rail or truck shipment to a preparation plant, a surge bin is unnecessary.

A number of angles must be considered in choosing a belt. It can be too stiff to trough, in which case the aligning action may be bad. There must be some relationship between belt width, number of plies and load to permit satisfactory troughing. The first problem is to get that relationship fixed. Since capacity also is a function of speed, that must be decided as one of the primary conditions.

Rubber belts for hoisting and conveying coal are made up of a carcass of woven fabric called "duck," with fiber cords or stranded steel cables for tensile strength, and the whole covered with rubber to protect the carcass. Belts must be able to resist shock and abrasion, withstand the stresses applied, bend over pulleys for years and have traction on the drive pulleys to drag the load.

Most of the belts in use have a fabric carcass made in various weights—28- to 48-oz. duck—folded into layers called plies, which are saturated with rubber to bind them together. A thin cushion of rubber between the plies permits compression and stretch in the inner and outer layers. A layer of fabric called a "breaker" tops the duck to protect the carcass against material falling on the belt. Over the breaker is a layer of rubber to protect the entire fabric structure from damage. The upper layer of rubber on the loaded side of the belt may be as much as $\frac{3}{16}$ in. thick to take the abrasion of the material and to cushion its fall. The lower layer, perhaps $\frac{1}{16}$ in., provides frictional contact with the driving pulley to haul the load. The edges often have the thickest rubber to take the accidental wear of guide pulleys or timbers that may be near the moving belt. War-built belts may have thinner than the usual standard cover because of government limitations.

Cord Belts Have Long Life

Cord belts have a carcass of cotton, rayon or other cords laid parallel with the belt center line in single or multiple layers and without the cross binding that woven fabric has. It is said to withstand the shock of material falling on the belt better than duck because the cords are free to separate and permit the rubber to stretch. Belt life and strength are asserted to be several times that of a duck belt.

Some cord belts are in hoisting service. One user says of them: "They trough better than duck belts but when spliced with metal fasteners do not hold as well." The latter item is of minor importance in a hoist belt, since all agree they should be made endless, in which case the splice is practically as strong as the belt itself. This same user indicates that his company has not come to a definite conclusion as to which of these two types of rubber belt may be best for hoisting coal.

Rubber belts with steel-cable carcasses are stated to be "much stronger" than ordinary cotton-cord belts. One such belt is in service on the Lake Superior Iron Range. An order for three additional belts of the same type has been placed. The coal industry is said to be watching its performance with hopeful interest. The claims for strength and life of hoist belts run in this order: duck, cord and steel. In that order it is possible that single lengths will replace two or even more lengths of the preceding types operating in tandem.

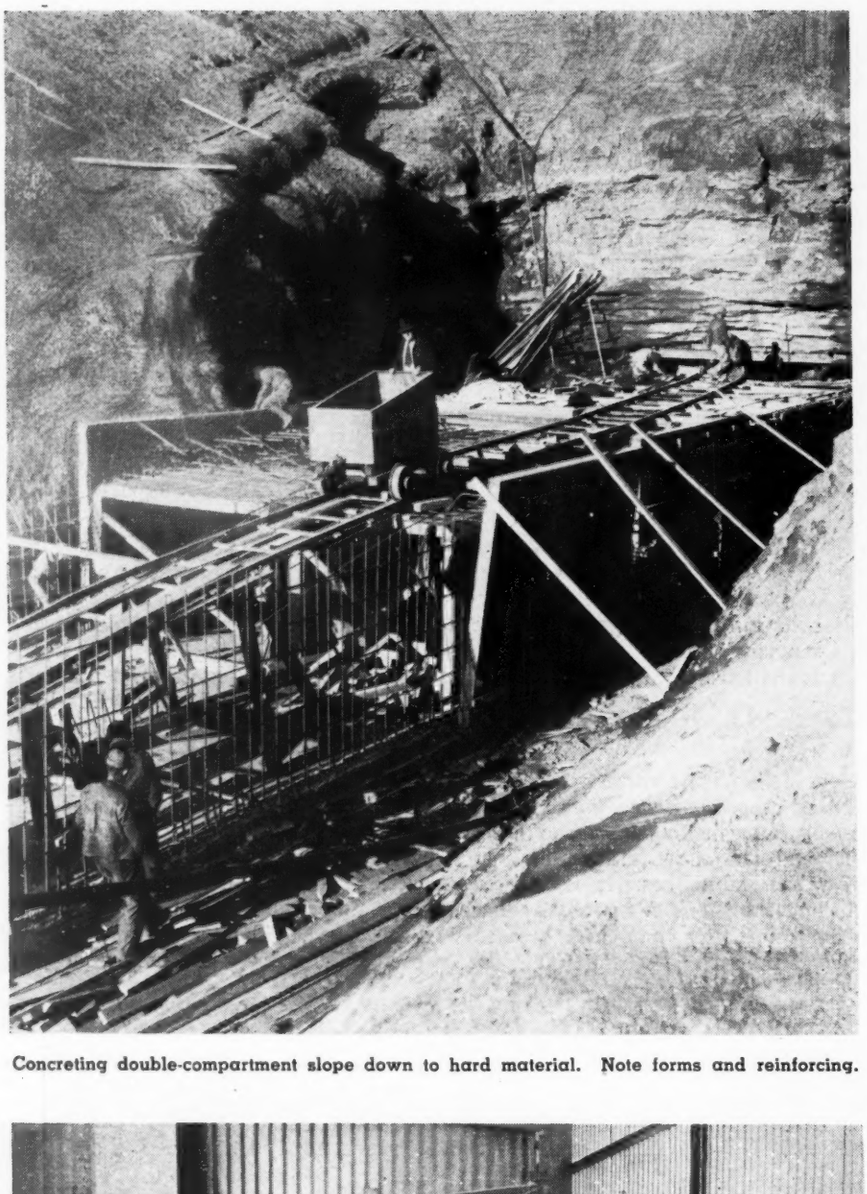
The following comparison of practical limits of belts of various constructions is based on this set of conditions: Slope, 15½ deg.; belt width, 36 in.; speed, 350 f.p.m.; coal-carrying capacity, 410 tons per hour; drive, single



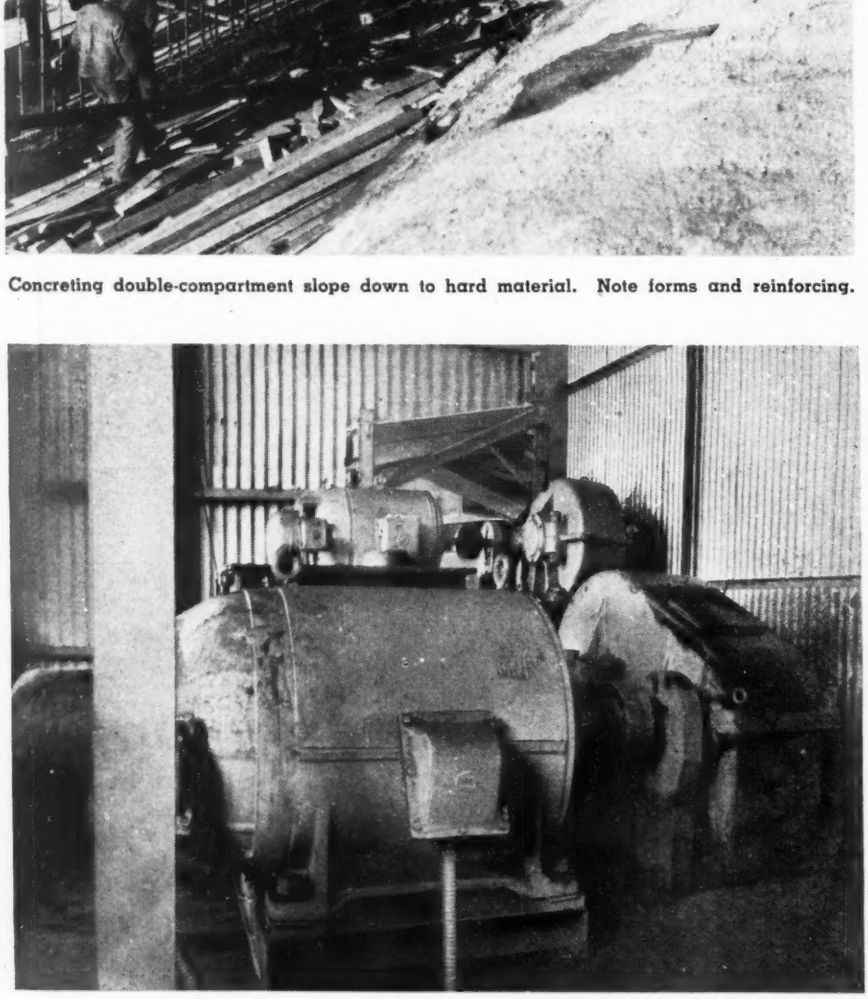
Looking down finished slope; mine has been running some time.



A factory expert splicing a 36-in. seven-ply synthetic rubber belt.



Concreting double-compartment slope down to hard material. Note forms and reinforcing.



A duel belt drive powered with 50- and 125-hp. motors. The belt is 36 in. wide.

pulley, snubbed; take-up, counterweight type.

Belt	Vertical Lift, Feet	Slope Length, Feet
Six-ply 42-oz. duck	159	572
Seven-ply 42-oz. duck	187	673
Cotton cord	242	873
Light steel cable ..... to	482	1,740
Heavy steel cable 1,592		5,741

Not only must a belt for hoisting coal be strong, pliable and long-lived (they cost a lot of money) but it must be correctly engineered, installed and operated to do the work and reach a respectable old age. The engineering of a belt is a complicated job involving character of material handled, capacity, length, speed, height of lift, size of pulleys, type of drive and many other factors, most of which are important. It is not possible to enter into a discussion of all these factors in this article. Belting and equipment manufacturers put out catalogs and handbooks that cover the subject with considerable thoroughness.

With all that, the services of a belt engineer and advice from experienced users will be needed. Such a little thing as freezing to a pulley has ripped off a strip of cover 100 ft. long before the belt could be stopped. A true-running belt is a thing of great value but a wobbly belt can result in a lot of trouble that proper training and a truly made splice would effectively remedy. Splices usually are made by factory experts and commonly are conceded to be worth what they cost.

These items about belts are worth noting:

Belts are best made endless.

They should be loaded centrally and evenly with the material moving in the direction of belt travel and delivered at belt speed.

Thickness of belt cover depends on the material handled.

It is important that belt design and idlers permit it to trough properly.

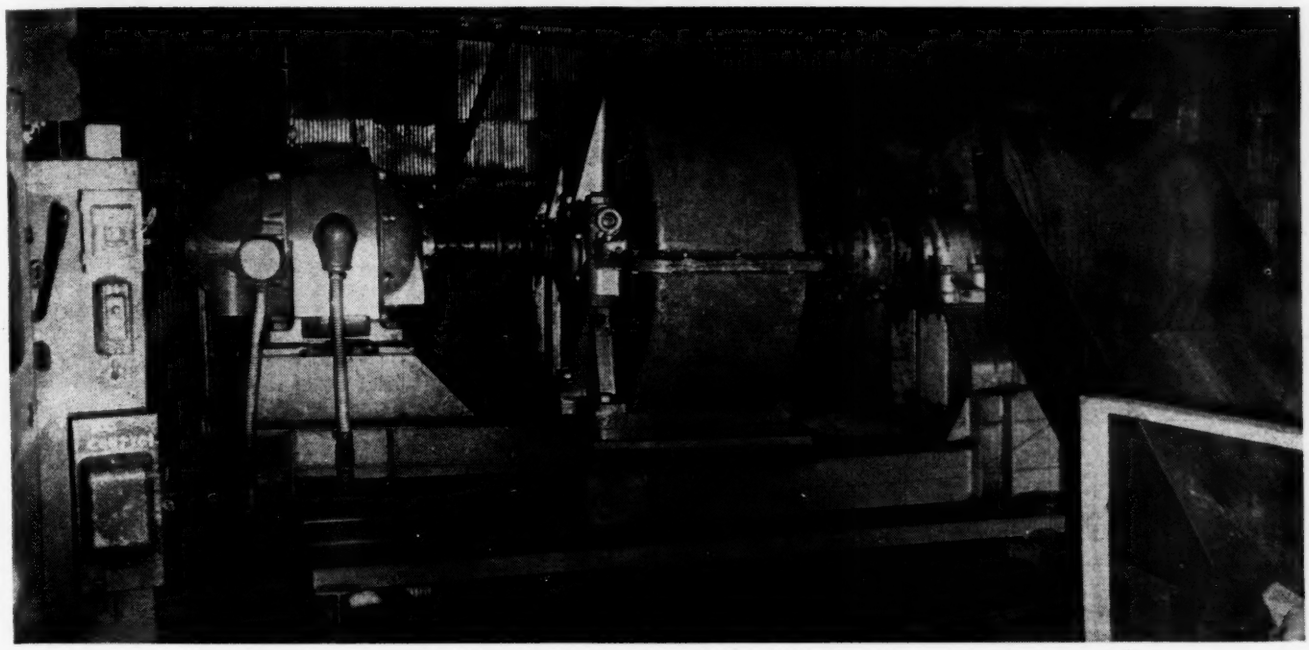
Speed should be such as to make it operate at capacity.

Material should be delivered to the belt between idlers to increase cushioning effect and extend belt life.

Depositing fines on the belt first will keep lumps from cutting the rubber or rolling.

Properly training both the load and return sides of the belt will prevent edge wear. The return side must be inspected as frequently as the loaded side. Carelessness in this matter may result in badly worn edges.

The drive equipment for a belt hoist consists of a motor geared to one or



A snub drive for a 36-in. cord belt; speed, 315 f.p.m. Head and tail shafts are on 963-ft. centers.

two pulleys, a foot shaft and pulley, the necessary troughing and return idlers, tension equipment and the motor control. There are belt hoists made up of two or more belts in tandem, each with its motor drive, because the distance may be too great for the strength of a single belt.

The motor or motors usually are slipring units. Loaded belts may thus be started with minimum current and no slip of the belt. Short belts sometimes are driven by high-torque squirrel-cage motors because of their low cost and simple control. Totally inclosed bath-lubricated speed reducers connect the motor to the driving pulley. Both motor and gear reducer customarily are mounted on the same base. Modern equipment has a flexible coupling connecting the gear reducer to the drive pulley, with the pulley shaft carried in anti-friction bearings.

Drives are single-pulley, tandem or dual. In any case the driving pulley is lagged with rubber belting pulled taut and secured with flat-headed bolts to "grip" the belt. Grooved lagging cut herringbone fashion has proved to be more effective than smooth lagging under wet conditions. The various forms of drives are designed to provide a long arc of belt contact on the driving pulley and thus reduce belt tension. In some cases this may reduce the thickness and cost of the belt.

Belt tensions on tandem and dual drives are rated as equal. With belt tension rated as unity for 360 deg. of pulley contact, the tension on a snubbed drive with 215 deg. of pulley contact must be increased approximately 22 percent. This means more or heavier plies of duck.

With the tandem drive, in which the two pulleys move at exactly the same surface speed, there is supposed to be some belt creep on the pulley faces because the tension and, therefore, the stretch is different on the two pulleys. The fact that this does not seem to affect the life of the belt is an indication that most of this "slip" may be absorbed by the stretch of the rubber of the belt cover and the pulley lagging. It could be possible there is no slip at all. In any event there is some power loss. If, as one manufacturer suggests, this loss is less than ½ percent, the cost with a 200-hp. drive would be about a dime a day.

Dual Drive Cuts Tension

Nevertheless, some mining men prefer the dual drive, which is supposed to eliminate this slip. The dual drive has another feature that frequently may be well worth considering: a reduction in belt tension. This leeway may be an advantage in one of several directions: an increase in pay load; a longer belt, which may save installing a second belt with its added drive; a less expensive belt.

In the case of the dual drive, the tension motor is much smaller than the main motor—about 40 percent its size—and is geared for a higher speed—approximately 5 percent. The tension motor has a fixed resistance in the rotor circuit, which is adjustable, by which the belt tension may be regulated. The division of load between the two motors varies with the actual load on the belt, the tension motor carrying the larger proportion when the belt is empty or lightly loaded and the main motor picking up load as the tonnage increases. Both motors are started at the same time by a dual control operated by one pushbutton.

The tail pulley need not be as large as the head pulley. The reason is that while the bending is more severe the high tension is lacking. Belt life is controlled by a combination of factors. When the severity of one or two factors is reduced, others may be increased and still keep the condition, as a whole, on the same level.

Troughing idlers are assembled in groups of three, are 5 or 6 in. in diameter and are of equal length. They usually are made of steel tubing for lightness and strength. Two schools of thought prevail as to the lubrication of idlers. One advocates anti-friction bearings "sealed for life" and the other grease-gun lubrication. In the first case, bearings run till they fail and then are replaced. In the second, constant attention to lubrication is necessary. When protected from dust and water, anti-friction bearings have a good record for long life. Troughing idlers usually are mounted on 4-ft. centers, but that is varied to meet conditions. When conditions are severe at the loading or transfer point, rubber-faced or pneumatic idlers often are used to reduce shock and injury to the belt.

Return idlers are single long rollers, or pulleys, somewhat longer than the width of the belt, mounted in bearings to match those of the troughing idlers,

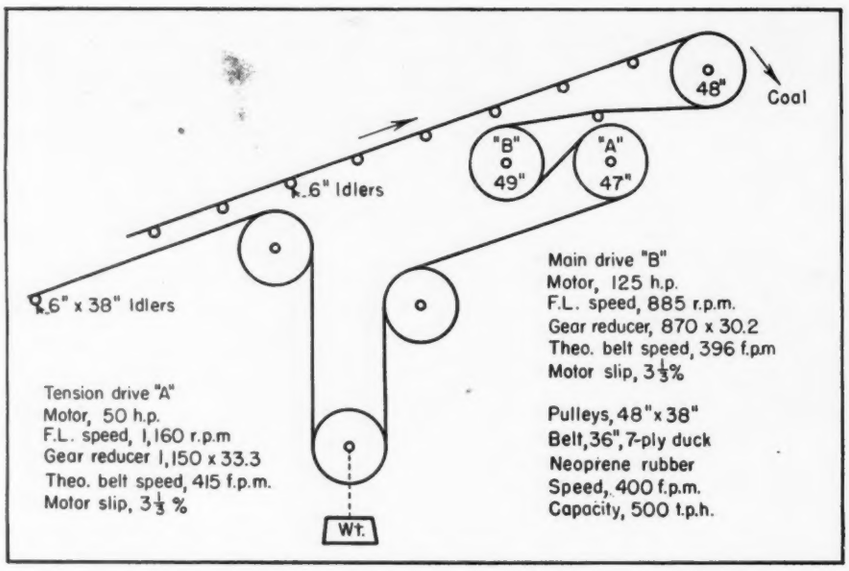


Fig. 1—Slope-belt layout using dual drive. The illustration represents the upper belt of a tandem hoist. The lower belt is similar except for the tensioning equipment, which is designed for the restricted room in the slope.

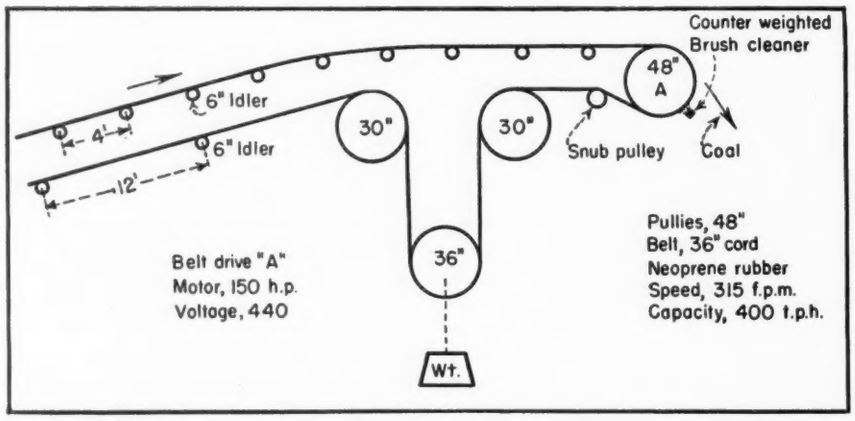


Fig. 2—Belt layout using a single-motor snub drive (upper belt of a tandem hoist). Both belts and hoist drives are similar. The lower belt has less footage on the slope but is flattened out to extend a considerable distance along the entry at the lower end.

and they are usually spaced at 10- or 12-ft. intervals.

One of the most important factors in belt operation is training. Special training idlers for both load and return sides of the belt are available from various manufacturers. Two types of troughing training idlers are seen frequently. One, of the troughing type, has a permanent forward slant of 2 deg. This often applies to all. There is an instance where one in ten did a more satisfactory job.

The other type mounts an entire troughing assembly on a center pin. When the belt climbs up one side, the training idler swings ahead on that side and forces the belt back to correct position in the center. It is just as important to train the return side of the belt. One type of return trainer automatically swings forward on the out-running side of the belt, working it back to its correct running position. Training idlers are set 50 or 60 ft. apart, in each case replacing a fixed idler. The use of vertical idlers for belt guides is discouraged because they wear the rubber cover off the belt edges and expose the carcass to destructive elements.

Provision should be made for an automatic gravity takeup equivalent to 1½ percent of the belt-centers distance.

It is important to provide a diagonal scraper or other means of cleaning the pulley side of the belt on its return. Otherwise, spillage from the loaded side may cause cutting of the belt when it passes over pulleys. If not removed this carry-over material may build up on the idlers, causing the belt to weave.

The belt must be "scotched" from running backward when the power is off for any reason. A pawl with ratchet on the head shaft sometimes is used. One prominent manufacturer recommends a differential band brake, for either mechanical or electrical operation.

Two Typical Installations

Typical belt installations include one at a mine where the vertical coal depth is 235 ft. The slope is extended 125 ft. vertically below the coal to provide for a 2,000-ton surge bin. This hoist (Fig. 1) has two belts in tandem, the upper being 772 and the lower 675 ft. long between centers. Each is equipped with its own dual a.c. motor drive.

The belts are 36-in. wide, 7-ply, duck carcass, using neoprene rubber. The upper covers are 7/32- to 3/32-in. and the lower 2/32-in. rubber.

The motors are 2,300-volt three-phase slipring units. Both motors of a drive are controlled by a dual starter inclosed in a single case. Weatherproof push-button stations at six locations control the two dual drives, which are so interlocked that the lower belt must stop first and the upper belt start first.

A coupling connects each gear reducer to the shaft of its drive pulley, which is mounted in spherically seated roller bearings.

Troughing idlers are 6x13½ in. and return idlers 6x38 in., all mounted in sealed roller bearings.

A second installation (Fig. 2) also consists of two belts in tandem with similar drives except that the tension equipment is modified for installation in the slope location. The lower belt covers a considerably shorter slope distance than the upper but extends for a considerable distance into the main mine entry, practically on a level. This mine has belt haulage that feeds directly onto the lower hoist belt without a surge bin. The reason is that only mine-run coal is loaded into railroad cars for switching to the preparation plant some distance away.

Since the two belts and drives are similar, only the upper one is described. The belt is cord construction 36 in. wide with ⅛-in. top and 1/16-in. bottom covers made from neoprene rubber. A breaker is included in the top cover. Length from head to tail shaft is 963 ft.; speed, 315 f.p.m.; lift of coal, 237 ft. vertically. About 50 ft. of the top end is run on the level. Troughing and return idlers are 6 in. in diameter on sealed anti-friction bearings.

The single driving motor is a 150-hp. slipring unit with push-button control, connected through a totally inclosed splash-oiled gear reducer to a single snubbed pulley that drives the belt. Motor, reducer and drive are mounted on one base, making a substantial job.

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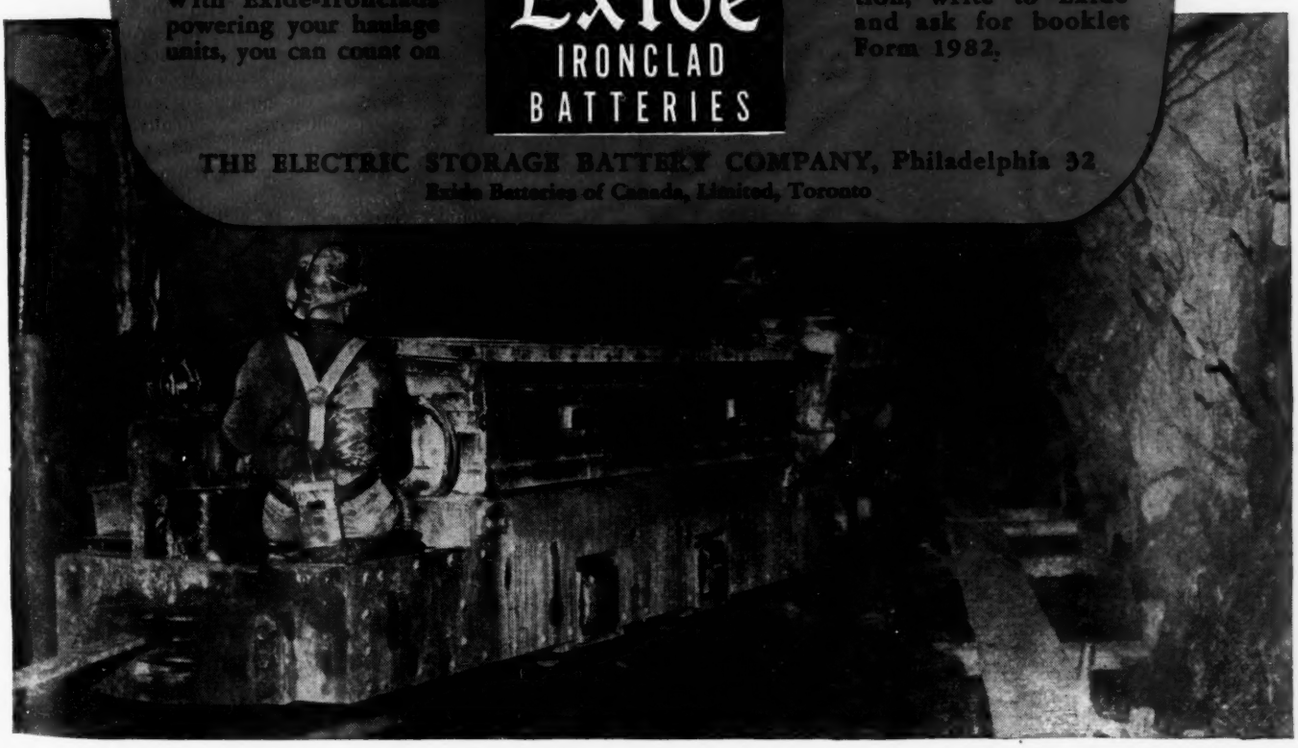
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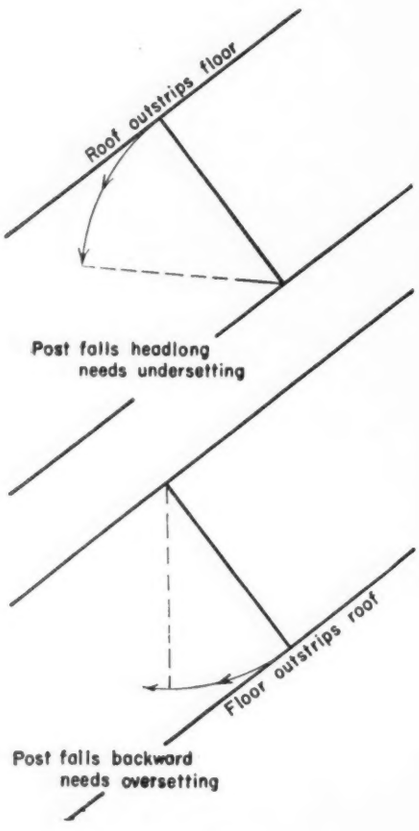
The Foremen's Forum

How Field Regards Oversetting of Posts

Authorities Hold Divergent Views as to Posting on Pitches but Agree That Conditions Vary and That No Simple Rule Will Hold Everywhere

COMMENTS from the field show that authorities do not agree as to the manner in which posts should be set and wedged in a place operating on a heavy pitch. Reliance is placed rather more, it would appear, on the sinking of the posts in the floor than on their being either underset or overset. Perhaps, the undersetting rule has acceptance because it has been so extensively and authoritatively promulgated and so little assailed that it has not been questioned.

Underset or Overset?—It may be, however, that the rule "Underset on a pitch" receives somewhat general approval because conditions indicating the need for oversetting have not been observed and, if observed, have not been sensed as a reason for modifying its universal acceptance. Or again, the advantage of oversetting possibly has seemed academic, for the need for oversetting is found only where the bottom is soft, and the softness of the bottom induces everyone to set the posts so well into it that, whether underset or overset, they will not be disturbed and will not fall down the pitch. Sinking the post, under those circumstances, may be a both easy and favorable way of securing an adequate and lasting support.



Undersetting Against External Violence—In moving around in a breast in the performance of their duties, miners tend to brace themselves against the tops of the posts, if the latter are not too tall, to avoid sliding downhill. Sometimes they project their weight against such posts. Against such pushes, undersetting is a protection. Undersetting is helpful also against the violence of shots.

Oversetting Against External Violence—Sometimes the miners pull themselves up the pitch by the posts, in which case, the hold being low, oversetting may be desirable. They also use the bottoms of the posts both to support themselves and the coal from slipping down the pitch. Such pressures, which would be on the upper side of the post and near to base, would favor oversetting.

How the Terms Originated—The term "underset" seems to have originated in the following manner: The foot of the post is first located and the post, instead of being set at right angles to the pitch, is leaned up the hill and there secured. It is quite natural to say that the foot of the post (the end of the post that is first set) is "underset," and then the expression is readily abbreviated to the effect that the post itself is "underset."

Kicking Uphill and Downhill—As, with an underset post, the top of the post should go down the pitch more than its bottom, the post will pitch headlong and the bottom of the post should tend to kick up the hill if not cured of that propensity by undersetting. Similarly, with a man, if his head is pushed forward, he will fall head first down the pitch. With a post that is overset, the foot of the post should slide down the hill more than the top, so the bottom of the post will slip up and slide on the rear of its foot down the hill, much as a man does when, on a slippery incline, the loose surface slides down the hill, leaving him with merely heel contact. In seconds he falls back on the seat of his overalls and then slides down the hill on his back, with his feet first. Unless the toe of the post is secured by sinking it into the floor or by wedging, the post will be upset as readily as a man.

See Big Slides on the Steep-Pitching Floor Faces of Strippings—Anyone who has observed the exposed floor faces of strippings of pitching beds, even in the hard floors of the anthracite region of Pennsylvania, will have no difficulty in understanding how such floors tend to slide and actually do slide down the pitch, even when the posts are sunk solidily into the floor. Swelling pyrite will help to set the clay in motion. So also underground will underset posts, for their tendency is to push their footings downhill, whereas an overset post tends to push the floor uphill, and the post presses the floor rock and thus prevents sliding. So oversetting a post is a factor that favors the stability of the floor rock even more than it does the stability of the post.

In a stripping, of course, frost is a more potent factor in producing slides than gravity.

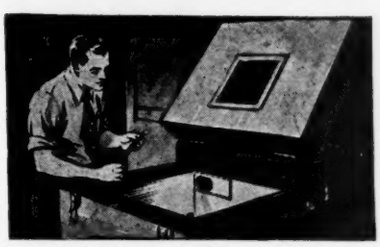
How a Big Hard-Coal Company Does It

The safety engineer of one large anthracite company favors undersetting in all cases except where the roof is hard and the floor soft and, in the latter case, favors the sinking of the top of the post 1 to 2 in. into the roof and also the use of a wedge, the foot being sunk 4 in. or more into the floor and held in place by a wedge driven down pitch. The top of the post also is set down pitch 5 deg. or more if the floor is very soft; this in a place advancing up the pitch (see Table I).



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In a sideling place, with a hard roof and soft floor, the top of the post is sunk in the roof 2 in., no wedge being used; the foot is sunk 4 in. into the floor and held in place by a wedge driven down pitch. The top of the post is set down pitch 3 to 5 deg. This is a recognition of the need for oversetting.

Methods of Another Big Company

A safety engineer of a large anthracite company with a wide range of experience in supervising many beds and properties at widely separated points, pitching at all angles, does not advocate any considerable undersetting and, in practice, does not overset with any of the conditions encountered. He says: "There are so many circumstances under which single props are used that it is safe to say that no fixed rule can be set regarding the proper method of installation. Past experience in mining is the best guide.

"Some of the major factors to be considered in determining the proper method of prop setting and timbering in general are: thickness, pitch, nature and hardness of the seam; also the character of the top and bottom rock, method of mining (whether first or second mining), width of working places, length of time the place must be kept open, etc.

"In general, where the roof is to be supported by single props, cap pieces are required and, if the bed is flat, the props are set at right angles to the formation. In seams pitching steeply, if the roof is strong and the coal is hard and the seam not over 6 to 8 ft. thick, single props sometimes are stood in hitches cut in the top and bottom with the head of the props set slightly up the pitch. With beds of more moderate inclination (meaning from 5 to 40 deg. of pitch) if the roof is very good and the bed has a tendency to break on the rib, single props hitched at the top and bottom with rib lagging are used to protect the miners against any material that may tend to fall.

"In thin and heavier pitching beds having a good top, a second row of props hitched at top and bottom is set, planked on one side so as to form a chute and travelway. The general practice in the pitching seams of this field is to secure the feet of single props in hitches cut into the bottom and to lean the head of the prop slightly up the pitch. In many cases, where the top is soft, single props, with or without cap pieces are used, when in reality the top should be supported by double timber.

"The ideas set forth in the article on this subject in last month's issue are in accord with the general practice in this field." The adjoining table is for the same pitch and thickness of bed as stated in Table I in this issue.

Comments of Former Mines Bureau Chief

"The article in the February issue on how to post a pitching bed is of much interest because it is the first time I have ever encountered any ideas that might lead one to believe that conditions exist under which props or posts should be set in a pitching bed in any other manner than by 'undersetting.' In any opening in a coal mine, two main forces act on the mine roof. One is the force of gravity tending to pull the roof in a plumb direction, while the other is the force tending to squeeze the opening shut; this force is in a direction normal to the bed.

"A prop intended to counteract both of these forces should lie in a direction along the resultant of these two forces, which is somewhere between the two directions. There probably has been no exact calculation of these two forces or their resultant but in practice the underlie of the prop on a pitching bed will be from 1 to 9 deg., which roughly fits pitches of 5 to 60 deg. or over.

"Of course, other forces act on props set in mine workings such as those of coal or rock moving down the pitch and striking or pushing against the props. These forces act in the direction of the dip and, in practice, are counteracted by setting the foot of the prop in a good 'hitch' dug into the bottom rock and by setting a good wedge with its point 'up the pitch'; not driven down the pitch, as indicated in Table I.

"I have never seen a soft floor in the anthracite region, nor a prop set with its head down the pitch—that is 'overset'—nor a floor wedge, though I have seen them in bituminous mines."—R. D. CURRIE, Engineer, General Reinsurance Corp., Trucksville, Pa.

Table I—Posting Practice of an Anthracite Company; Coal 4 Ft. 3 In. Thick; Pitch 65 Deg.

	Posts Are Underset to Hold Them in Place			Posts Overset to Hold Them in Place
Rising Place Advances up Pitch	(1) Roof and Floor Hard	(2) Roof Soft, Floor Hard	(3) Roof and Floor Soft	(4) Roof Hard, Floor Soft
Sink post into roof	1 to 2 in.	Driving fit on cap piece	About 2 in.	1 to 2 in. if possible
Is a wedge used at roof?	Yes	Yes, often small	Yes	No
How is roof wedge driven?	Down pitch	Down pitch	Down pitch	———
Sink post into floor?	3 to 4 in.	3 to 4 in.	About 4 in.	4 in. or more
Is wedge used at floor?	No	No	No	Yes
How is floor wedge driven?	.....	.....	.....	Down pitch
Are cross-pitch wedges used?	No	No	No	No
Top of post is set up pitch	About 3 deg.	3 to 5 deg.	About 2 deg.	.....
Top of post is set down pitch	.....	.....	.....	5 deg. or more if floor is very soft
Sideling Place Advances on Level	(1) Roof and Floor Hard	(2) Roof Soft, Floor Hard	(3) Roof and Floor Soft	(4) Roof Hard, Floor Soft
Sink post into roof?	No	No	No	About 2 in.
Is a wedge used at roof?	Yes	Cap piece and wedge	Cap piece and wedge	No
How is roof wedge driven?	Down pitch if space permits. Up pitch if not	Down pitch if space is available*	Down pitch if space is available*	.....
Sink post into floor?	3 to 4 in.	3 to 4 in.	Depth depends on softness of floor	About 4 in.
Is a wedge used at floor?	No	No	No	Yes
How is floor wedge driven?	.....	.....	.....	Down pitch
Are cross-pitch wedges used?	Occasionally	Occasionally	Occasionally	No
Top of post set up pitch	3 to 5 deg.	3 to 5 deg.	2 to 3 deg.	.....
Top of post set down pitch	.....	.....	.....	3 to 5 deg.

* Up pitch, however, if post will not be forced out of position.

Table II—Posting Practice of Another Anthracite Company; Coal 4 Ft. 3 In. Thick; Pitch 65 Deg.

	All Posts Are Underset to Prevent Their Displacement			
Rising Place Advances up Pitch	(1) Roof and Floor Hard	(2) Roof Soft, Floor Hard	(3) Roof and Floor Soft	(4) Roof Hard, Floor Soft
Sink post into roof?	1 in.	Set cap piece	Set cap piece	1 in.
Is a wedge used at roof?	Yes	Yes	Yes	Yes
How is roof wedge driven?	Down pitch	Down pitch	Down pitch	Down pitch
Sink post into floor?	2 in.	2 in.	Use mud sill	Use mud sill
Is wedge used at floor?	No	No	No	No
Are cross-pitch wedges used?	No	No	No	No
Set top of post up pitch?	1 to 2 deg.	1 to 2 deg.	1 to 2 deg.	1 to 2 deg.
Sideling Place Advances on Level	(1) Roof and Floor Hard	(2) Roof Soft, Floor Hard	(3) Roof and Floor Soft	(4) Roof Hard, Floor Soft
Sink post into roof?	1 in.	Set cap piece and bar	Double timber*	1 in.
Is a wedge used at roof?	Yes	Yes	Over heel of collar	Yes
How is roof wedge driven?	Down pitch	.....	Either up or down	.....
Sink post into floor?	2 in.	2 in.	Mud sill	Mud sill
Is wedge used at floor?	No	No	No	No
Are cross-pitch wedges used?	No	Yes	No	Yes
Set top of post up pitch	1 to 2 deg.	1 to 2 deg.	1 to 2 deg.	1 to 2 deg.

* Two or three-piece set and lagging used if necessary.

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State-Board Questions

Mine Foremen, Alabama

Q.—What steps should be taken, when preparing a timber program, for preventing accidents from falls of roof and coal?

A.—(1) *Study Carefully All Past Accidents From Falls of Roof and Coal in the Same Mine and Coal Bed*—If the mine is old, and if the manager, superintendent and mine foreman have had experience in its operation, they should have accident records available showing: (1) just where accidents have occurred, (2) the widths of the room and the pillar at these places, (3) the distance of the man from the ribs and face at the time he received his injury, (4) what he appeared to be doing when the accident occurred; (5) the cause of the weakness in the roof, whether from (a) its bone coal, (b) rooster coals (vagrant roof coals), (c) roof rock that expands with moisture or with oxidation, (d) frequent laminations in the roof strata, (e) methane or water under pressure in the roof, (f) crevices, (g) faults, (h) pyrite, (i) fossilized tree stumps, (j) masses of vegetal matter in the roof (roof bells), (k) clay seams, (l) clay beds, (m) dinosaur footprints or other abnormal conditions; (6) the extent of the fall and (7) the character of the timbering at the time the fall occurred. These records should give convincing evidence of the correctness in the main of the present system or of its weaknesses.

The records should show, when cars are loaded at the face, whether safety posts should be erected between face and mine car for the protection of the lives of the men in such loading or whether it would be safer to load cars by conveyors at a relatively permanent, strongly supported station near the heading than at a temporary one located near the face (see Fig. 1). The recorded experience should indicate whether the posts should be temporary or permanent. If temporary, they are to be removed when the new front line of timbers has been set or when the side lines and cross timbers have been erected.

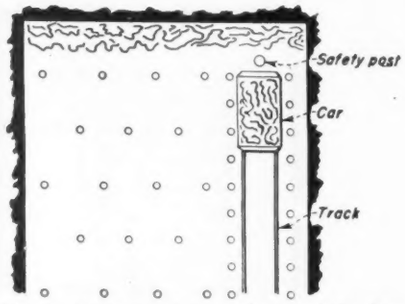


Fig. 1—Safety post to protect coal loaders.

It will show whether, if the face is shot in sections, each section must be loaded separately and promptly posted or whether it will be safe to shoot the entire face without such timbering (see Fig. 2). Under very bad conditions, advance posting will be needed. (see Fig. 3), and crossbars may have to be needled into face (see Fig. 4). The question of economic face operation will have a place here, though safety conditions will govern. Another consideration to be under advisement is the method of pillar removal. The person developing the plans will have to consider lines of roof breakage, pillar removal, retreat or advance, and nearness of solid pillar support (see Coal Age, December, 1943, pp. 89-90, and July, 1944, p. 90).

(2) *What Plans Should Show*—Plans should designate where timbers should be erected, how many timbers should be set in each room, how long the crossbars should be and of what cross-section, and just when such timbers should be set. They should indicate, at least in a degree, where, after undercutting, sprags should be placed under the coal to support the coal thus undercut.

(3) *Base Plan on Experience With, and Nature of, Drawslate*—Quantity and size of timber never should be gaged on the total depth of the coal below surface, unless the cover is quite shallow, because the posts are not intended to support all the several strata between a deep seam of coal and the surface. That support must be afforded by the pillars.

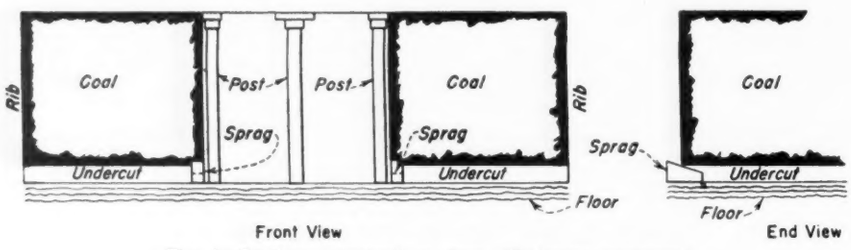


Fig. 2—Sections removed in turn. Undercut spragged.

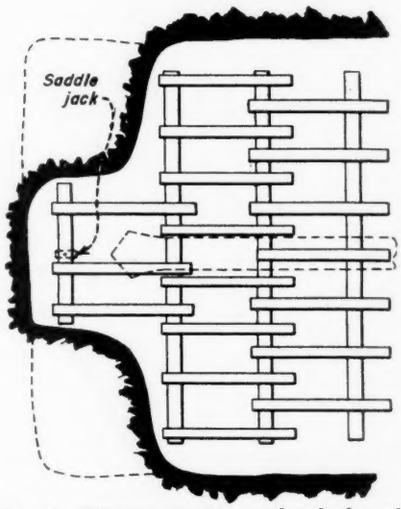


Fig. 3—Advance posting under bad roof.

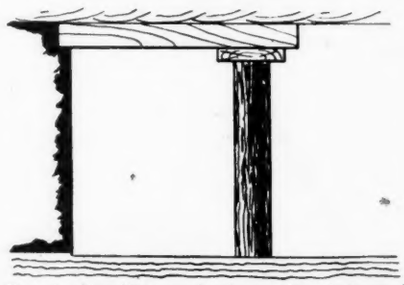


Fig. 4—Needling end of crossbar into coal.

Except at medium depths, the timber will be unable to undertake that task, and even then all the rock except that lying usually within 20 ft. above the top of the coal should be able to stand firmly supported by its strength and that of the room pillars, except near the outcrop. Quantity and size of posts should be predicated on the roof span and on the ability of the drawslate to support itself between posts, on how many feet above the coal the roof will break when the pillars are still standing and the posts are removed, and to what extent the roof is laminated.

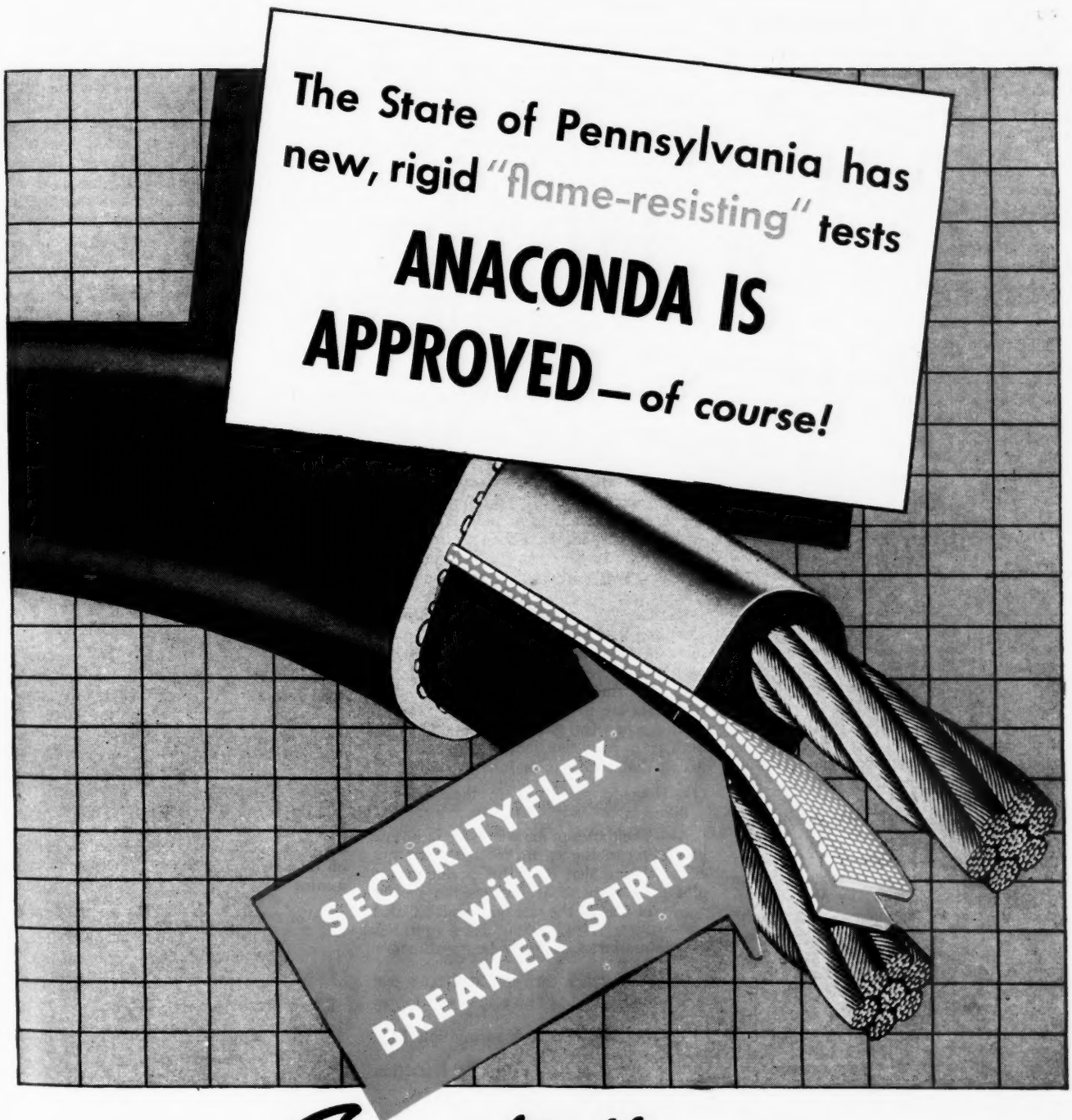
(4) *Ask Opinions of Others*—If the foreman has no access to local experience in the operation of the coal bed or coal beds to be extracted, he should seek the judgment of State and federal mine inspectors and of neighboring foremen, superintendents and managers. In fact, where the conditions existing are common to several mines, it might be well to have the matter considered by a committee representing all such mines and their supervisory forces, not for the framing of hard-and-fast specifications, common to

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all the mines under consideration, but so as to serve as a guide in framing ways of meeting the conditions at each particular mine. It will be seen that the plan is rather too time-consuming for a foreman to attempt. It is rather a subject to be undertaken by a general manager or vice president in charge of operations, who should be glad to handle it as a means of reducing his accidents from roof and coal falls.

(5) *Discuss Local Plan With Assistants and Get State Inspector's Approval*—No matter how the plan is determined or whose experience is embodied in it, it should be shown to, explained to, and discussed with the subforemen, and finally it should be submitted to the State mine inspector and be amended if necessary to meet his approval.

(6) *Err on Safe Side, but Provide for Supplementary Timber*—The plan should err distinctly on the side of over- rather than under-posting, and it should be understood that, if in any case more posting is necessary, because of any unusual weakness being manifest, it must be supplemented to satisfy the foreman's judgment. Such weakness may be caused by rock crevices, stumps, roof bells, dinosaur footprints or other abnormal conditions.

When a plan has been made, seven advantages are apparent: (a) everyone has a basic standard to follow. Only a few more posts than indicated in the plan will have to be set. So all the men in a mine are hampered to about an equal degree. That equality makes for all-around satisfaction. No one feels he is being victimized when he is told that the general plan for all workings specifies a prop should be placed at a certain spot.

(b) Every man knows what has to be done. It is the unexpected requirement that makes men discontented. Anything outside the regular line of duty irks the workman as it does all other human beings. If he knows what he has to do, he prepares to do it, and it does not trouble him as much as would a duty he did not expect to have to perform. If it is a routine to be followed, he takes it happily in his stride.

(c) Everyone in the mine knows the minimum number of posts that will be needed to support each cut, and provision can be made accordingly to suit the needs of the workmen.

(d) New men will have written authority to direct their operations.

But (e), and more importantly, the miner can be told definitely that he is at fault if he fails to follow the plan. Any other system leaves posting to his judgment until the foreman or subforeman arrives. Then there almost always is a conflict between his judgment and the supervisor's judgment. He is perhaps a man of long experience, and he begins to compare his lifetime of mining with the supervisor's brief career, for the supervisor probably is a younger man.

But with a plan generally enforced, recommended and approved by many long-experienced authorities, the man's judgment is less belittled than if he has been obliged to give up his way to follow that of another who he perhaps has reason to believe is less experienced, at least in the conduct of timbering in the particular locality and seam of coal. Besides, it is a sort of legal enactment and most men hold the law in some degree of respect.

(f) A man cannot well be disciplined for not using good judgment, but he can be brought to book for breaking an established and legal minimum safety requirement.

(g) Thinking a plan through and putting it on paper will clarify ideas and generate fundamental concepts.

When a post, according to plan or supplemental to plan, is to be placed, the supervisor who orders it erected should be specific and say where, why, when (now), how, and by whom it shall be placed. A cross in the roof should show where the post should be located. Beware of saving vaguely: "This place isn't safe; post it." Better than mere orders, however explicit, is staying in the place and seeing before leaving that it is properly posted.

See that the men have the right and safe tools for scaling roof and for cutting and erecting props. Have the props cut as near the right length as possible and provide wedges so that there will be no disposition to delay the placing of props. Instruct those in authority not to hurry and harass the men who are sounding roof or erecting posts, even if, by strict adherence to plan, production is delayed. The supervisor himself who causes the production to be lowered a car of coal or so a day has, as we say, an excellent alibi. He is merely insisting on a rule approved by all those in authority and he can explain to the workman that if he (the supervisor) doesn't insist on compliance with the regulation he may forfeit his job. Men often would sooner violate safety rules than delay the work of other men, especially if thereby their earning power is decreased.

The roof should be sounded whenever anything is done that will subject it to stress or weaken it, as well when a new crew comes in to work in the room. Whenever a foreman enters a place, the roof should be sounded and, if the rock proves hollow, it should be posted or taken down, by a man standing outby the rock and clear of it. If it can't be brought down by bars or wedges, it must be either blasted down or propped up securely. In barring down, long bars should be used and not picks, and the scaling bar should have a guard on it to prevent the rock from sliding down on it onto the fingers of the man by whom the bar is being used.

Always remember, a few unneeded posts will pay big dividends in life, liberty and pursuit of happiness, and save the miner much more than it will cost the operator.

Mine Foremen, Ohio

Q.—What is meant by "diffusion of gases"?

A.—Their mixture with each other when they come in contact. Gases can be carried from place to place by being picked up by other gases, such as air, and carried along with them. This is termed "convection," or carrying; or they can move through one another by "diffusion" when the gases, except for that mixing and their eternal intermolecular movement, are stationary. Diffusion is termed an intermolecular movement because the molecules of one gas mix with the molecules of another, not as a body but molecule by molecule. These molecules are in constant motion, and that motion when two gases are in contact takes both gases over the line into the opposing gas so that they mix or interpenetrate.

Q.—How do gases vary in their rates of diffusion?

A.—Their rates of diffusion vary in inverse proportion to the square roots of their specific gravities; that is, if the specific gravity of Gas *A* is twice as high as the specific gravity of Gas *B*, the rate with which Gas *A* will diffuse into Gas *B* will be $\frac{1}{\sqrt{2}}$ times = 0.7071 times that with which Gas *B* will diffuse into Gas *A*. (The easiest way to calculate the value of $\frac{1}{\sqrt{2}}$ is to multiply both numerator and denominator of the fraction by $\sqrt{2}$, and we have $\frac{1 \times \sqrt{2}}{\sqrt{2} \times \sqrt{2}} = \frac{\sqrt{2}}{2} = \frac{1.4142}{2} = 0.7071$). The heavier the gas, the slower it diffuses, or, what is the same thing, the lighter the gas, the more rapid its diffusion.

Carbon Dioxide Sluggish—Carbon dioxide diffuses slowly, as its specific gravity is 1.5282, and methane diffuses more rapidly, because its specific gravity is only 0.5543. The square root of 1.5282 = 1.2362 and of 0.5543 is 0.7445, so methane diffuses 1.2362÷0.7445 times=1.660 times as fast as carbon dioxide. The rate of diffusion of carbon dioxide will be $\frac{1}{1.2362} = 0.8088$ and that of methane is $\frac{1}{0.7445} = 1.3432$.

However, one must remember that often the diffusing gases are not of the same temperature and that the specific gravity depends on the temperature. This has a bearing on the diffusion that occurs after explosions and during mine fires, where a cooler mixture of gases may come in contact with a hotter mixture or, in a lesser degree, where air descends into the mine through crevices or a borehole to satisfy a change in barometer on the surface or a change in temperature in a mine.

Rate of Diffusion Into Air of Various Gases Likely to Be Found in Mines

Gas	Specific Gravity	Relative Speed of Diffusion
(1) Hydrogen	0.06959	3.802
(2) Methane	0.5543	1.343
(3) Acetylene	0.9107	1.048
(4) Carbon Monoxide	0.9672	1.017
(5) Nitrogen	0.9674	1.017
(6) Air	1.0000	1.000
(7) Ethane	1.0488	0.976
(8) Oxygen	1.1053	0.951
(9) Hydrogen Sulphide	1.1898	0.917
(10) Carbon Dioxide	1.5282	0.809
(11) Nitrogen Peroxide	1.5889	0.793
(12) Sulphur Dioxide	2.2638	0.665

Specific gravities of all but sulphur dioxide taken from U. S. Bureau of Mines I. C. 6983. The nitrogen peroxide specific gravity is assumed and not taken from the B. of M. circular. An unstable gas, its specific gravity at mine temperatures is perhaps not readily ascertained.

DRILLING COAL MASTER TOOLS

CENTRAL MINE EQUIPMENT COMPANY

MANUFACTURERS OF MINING TOOLS AND EQUIPMENT

ROsedale 5111

4520 ENRIGHT AVENUE
ST LOUIS 8, MISSOURI

TO THE MINING INDUSTRY
AND DRILLING SPECIALISTS:

Central Mine Equipment Company is pleased to announce the appointment of the following nationally-known firms as distributors of COALMASTER drilling products:

- AUSTIN POWDER COMPANY, Cleveland, Ohio:
  Manufacturers of Red Diamond explosives and blasting accessories.
- BUDA COMPANY, Harvey, Illinois:
  Manufacturers of earth drills and earth sampling equipment for strip mines, contractors, and soil testing.
- DIAMOND SUPPLY COMPANY, INC., Evansville, Indiana:
  Distributors of Austin Powder and blasting accessories.
- DOOLEY BROTHERS, Peoria, Illinois:
  Manufacturers of Superior mounted-electric coal and rock drills.
- ILLINOIS POWDER MANUFACTURING COMPANY, St. Louis, Missouri; Denver, Colorado; Salt Lake City, Utah:
  Manufacturers of Gold Medal explosives, Black Diamond permissibles and blasting accessories.
- SALEM TOOL COMPANY, Salem, Ohio:
  Manufacturers of McCarthy earth drills for strip mining and mining equipment.

Through their technical engineering staffs and widespread warehousing facilities, COALMASTER will be better able to serve you in the solution of your drilling problems.

Sincerely,

T. E. Rassieur

T. E. Rassieur
President

TER:bb

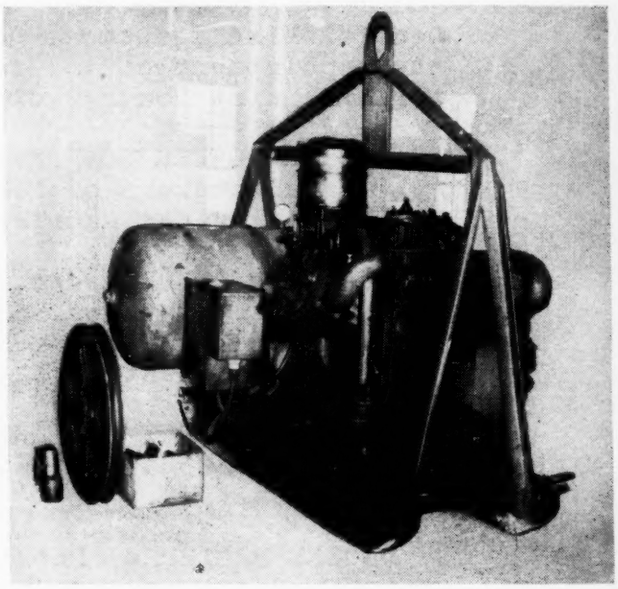


Operating Ideas

Portable Compressor Handled by Crane

EQUIPMENT MAINTENANCE for strip mines calls for the use of many air-driven tools, such as cutting chisels, riveting hammers, drills and reamers. On big jobs this may require a sizable air compressor to drive several tools at a time. Such work may be on the ground, up in the cab of a shovel or at a point outside the shop.

Northern Illinois Coal Corp., Wilmington, Ill., has mounted a motor-driven automatically controlled V-type compressor on a steel sled for quick transfer to any part of the property. A permanent steel lifting frame has been welded to the sled. An eye cut in a vertical flat steel plate at the center permits the compressor to be quickly lifted aboard a shovel with a small dragline or crane. The lifting frame avoids the need for chain or rope hitchings, promoting safety and increasing efficiency in handling the compressor.

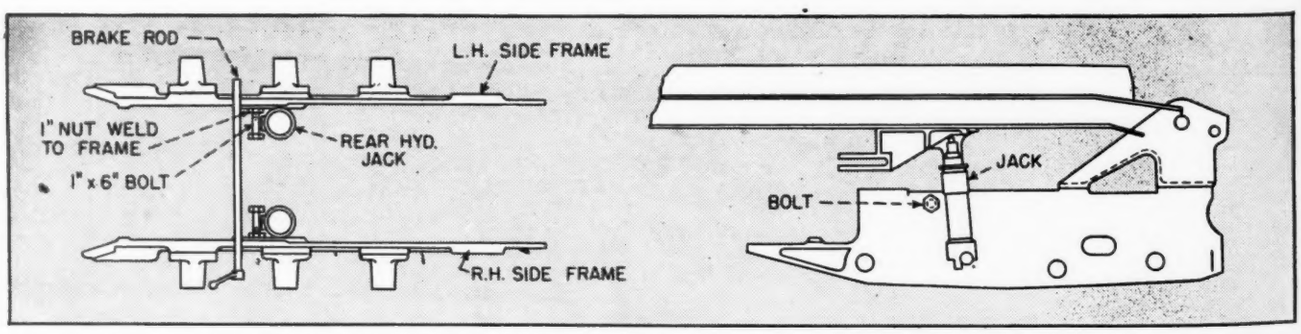


The lifting frame for this portable air compressor is made of a steel angle tripod welded to each end of the sled, a pipe spreader, a flat steel strut or bail and a flat steel lifting eye. It is ready for any job, on the ground or in the air.

Jack Guard Saves Time and Minimizes Loader Damage

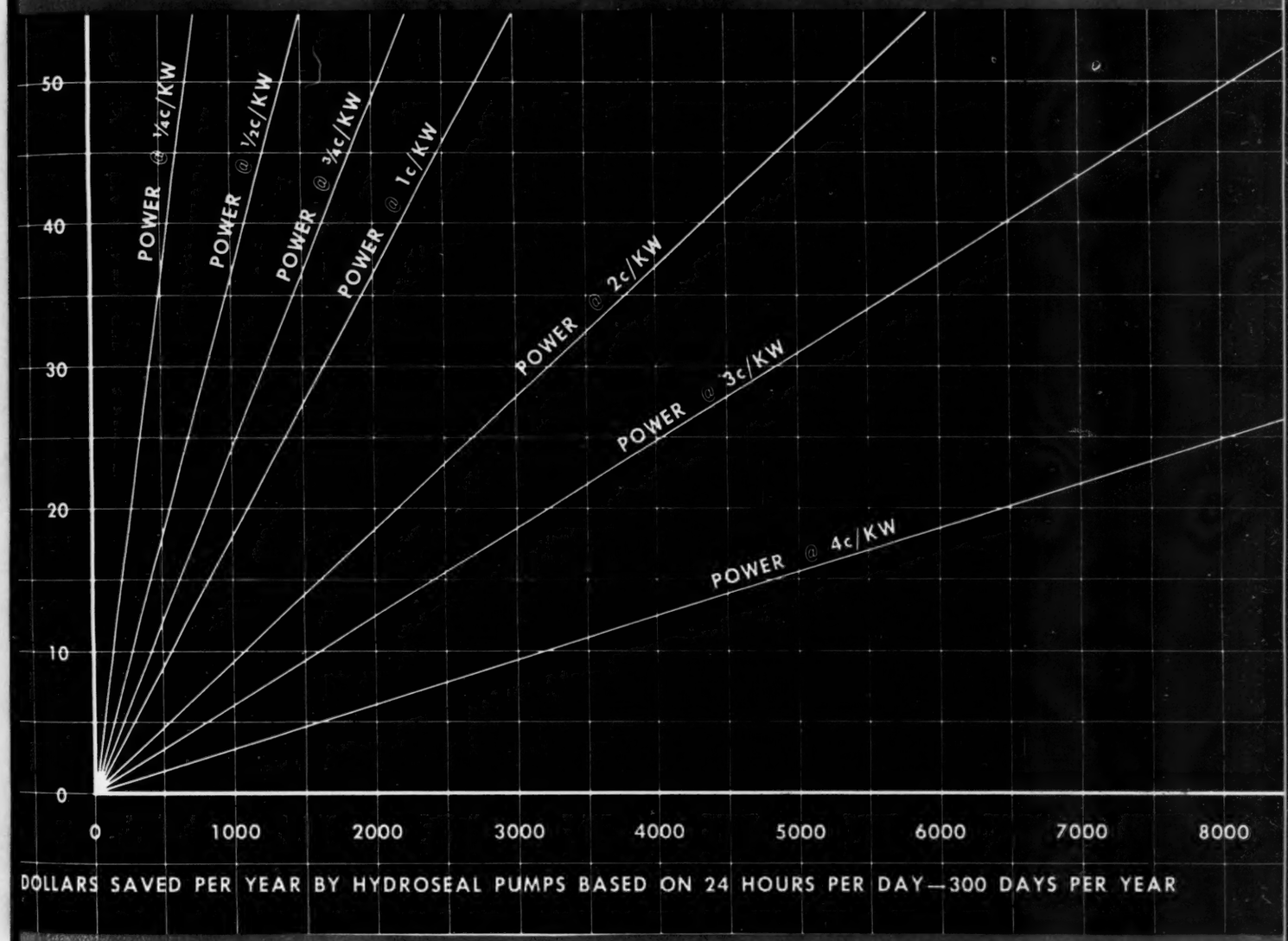
BREAKING OF PINS of rear lifting jacks cannot damage brake rods as they formerly did and no longer requires taking the loading machine out of service at Banning No. 1 mine of the Pittsburgh Coal Co., Van Meter, Pa. The change, shown in the drawing, was made by John Narbut, master mechanic at that mine.

Trouble stemmed from the fact that when a jack pin (No. 2017-1) broke it allowed the jack to kick out and bend the brake rod (No. A235YX). This difficulty was surmounted by welding a 1-in. nut to the frame and screwing into it a 1x6-in. bolt. This forms a guard of sufficient strength to stop the jack when it kicks in that direction, thus keeping it in approximately normal position and preventing it hitting the brake rod.

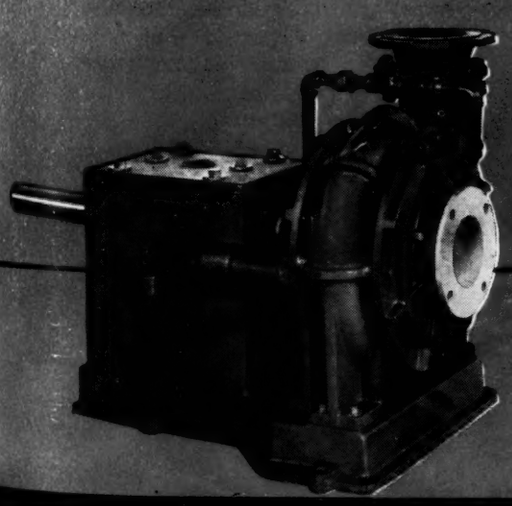


The guard or stop is inexpensive—just a nut welded to the frame and a bolt screwed into it.

Figure Your Own Savings
with Hydroseal Efficiency



Sand, Slime and Slurry Pumps—running 24 hours a day—300 days a year—use a lot of costly power. When a pump on this type of service can pay for itself in one year or less, out of what it saves in power alone, then, it's really EFFICIENT. Hydroseal Pumps with Maximix Rubber Lining, or made of Abrasive Resistant Alloy, are repeatedly doing this, even under the most difficult pumping conditions. Generally, they save ⅓ to ½ in power costs and, as an extra bonus, users save in maintenance costs, due to the Hydroseal Principle. If you haven't seen our Catalog No. 140, better write for a copy today.



HYDROSEAL PUMPS

HYDROSEAL, PACKLESS AND MAXIMIX DESIGNS ARE COVERED BY PATENTS AND APPLICATIONS IN THE MAJOR MINING CENTERS OF THE WORLD

Correspondence from United States and Canada to

ALLEN-SHERMAN-HOFF CO., 231 S. 15th St., Phila. 2, Pa.

Correspondence from anywhere else in the World to

A-S-H EXPORT CO., 271 Madison Ave., New York 16, N.Y.

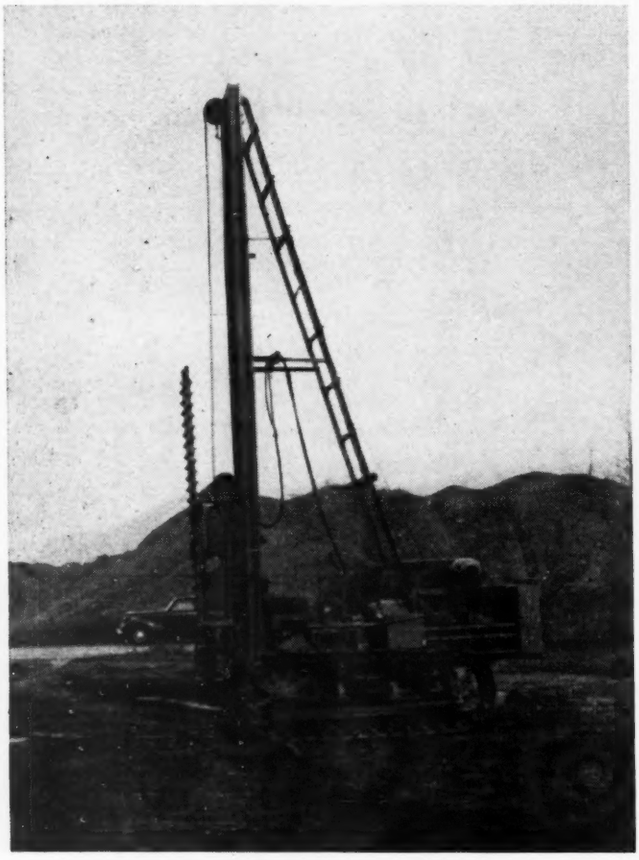
CABLE ADDRESS: ASHEXPOR, NEW YORK—BENTLEY'S CODE

Either of above offices will direct you to nearest representative

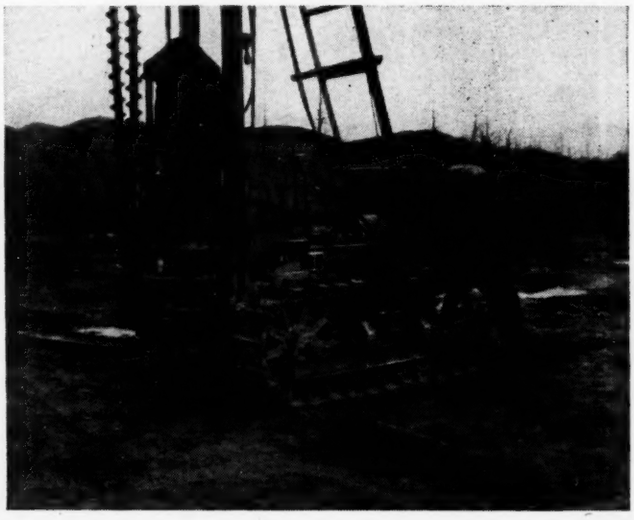
Heavy Utility Drill Mounted on Cats

BUILT TO ORDER in the shop of one of the progressive strip-mining companies of the country, the rotary drill shown in the accompanying illustrations can be used for prospecting or for blasting where small-diameter explosive is satisfactory. In accordance with standard practice, it is mounted on a crawler tractor, with the drill motor and speed reducer at one end and the small hoist rig at the other.

The drill sections are 10 ft. long. The bits are inserted in a cutter head that makes a 6¼-in. hole. A feature of the unit is the large motor and unusually heavy gear reducer—one of the best made. The result is a moderate-weight easily operated auger drill with the heft to push the cutter into hard material backed up by plenty of power to turn it in tough cutting.

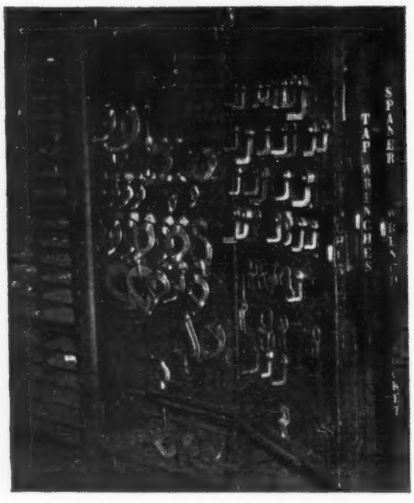


The new utility drill set up ready to work.



Tower, motor and reducer are at one end of the tractor and the hoist at the other.

Door Racks Utilize Wall Space in Tool Room



Tool racks are swung back into the recess where they are out of the way.

SWINGING RACKS carrying special tools make good use of wall space in the tool room at the Lehigh Navigation Coal Co.'s Central Repair Shop, Lansford, Pa.

The racks, shown in the accompanying illustration, carry bent tail lathe dogs, tap wrenches, sockets, etc. Besides using the wall space to good advantage this method of tool storage allows the tool-room clerk to swing the racks out where the light is better for selecting the right piece.

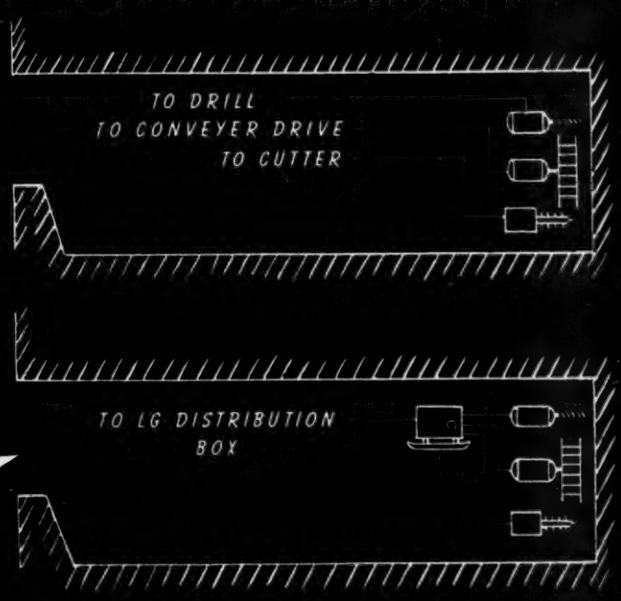
Cleared Up?

What about that case of trouble you were bothered with some time ago? Never hear you complain anymore—it must be cleared up. We'd like to know how you fixed it—and so would some others. Won't you submit the method used for publication? Remember, it can be a mechanical, electrical, operating or safety idea, and you don't have to stop with one idea. If accepted, Coal Age, upon publication, will pay you $5 or more for each.

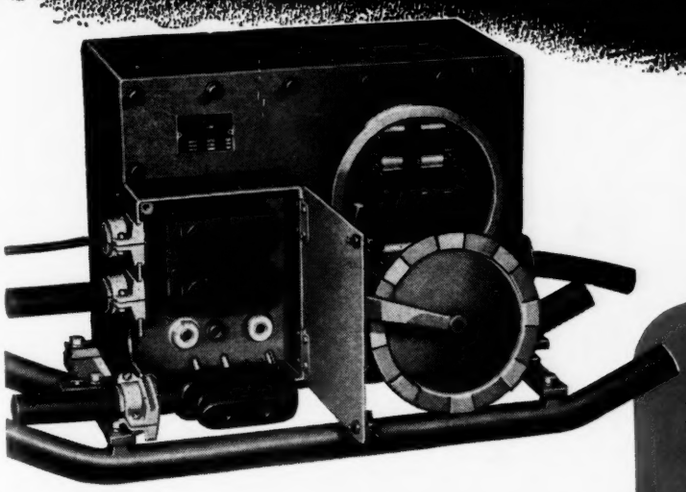
HOW AN O-B TYPE LG DISTRIBUTION BOX CAN SAVE ⅔ OF YOUR MULTIPLE CONDUCTOR CABLE REQUIREMENTS

It's a case of simple Arithmetic

3 separate trailing cables needed to handle this room set-up



Only 1 cable needed to handle same set-up with O-B type LG Distribution Box



APPROVED BY U. S. BUREAU OF MINES

Write for

DESCRIPTIVE BOOKLET

2705-M

Ohio Brass

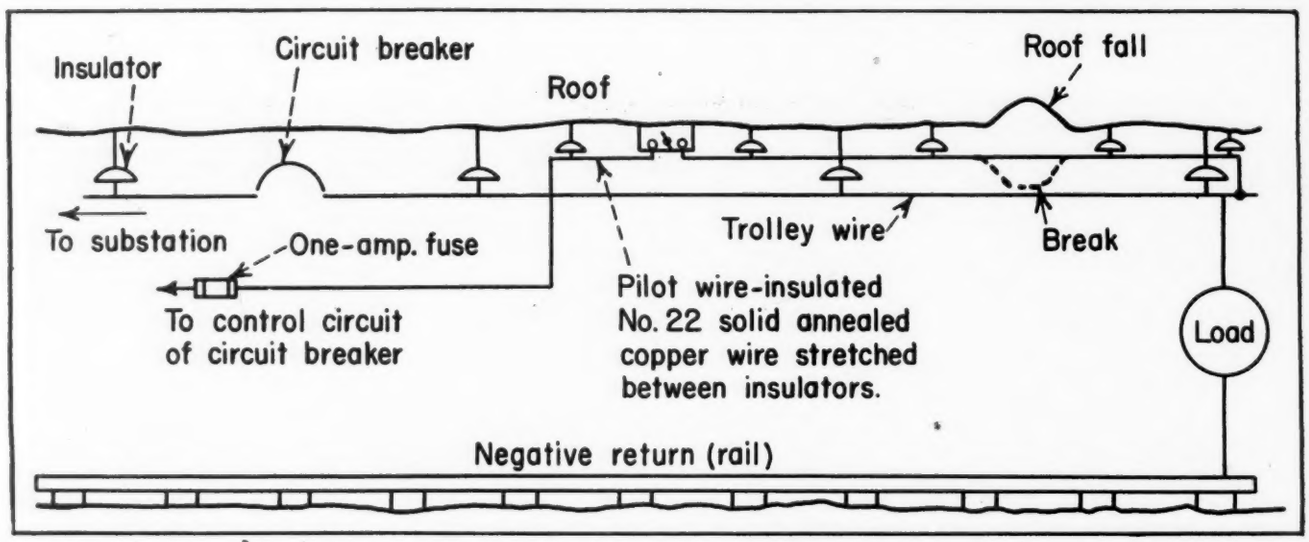
MANSFIELD, OHIO

Canadian Ohio Brass Co., Ltd., Niagara Falls, Ontario

Pilot Wire Opens Breaker Before Trolley Wire Falls

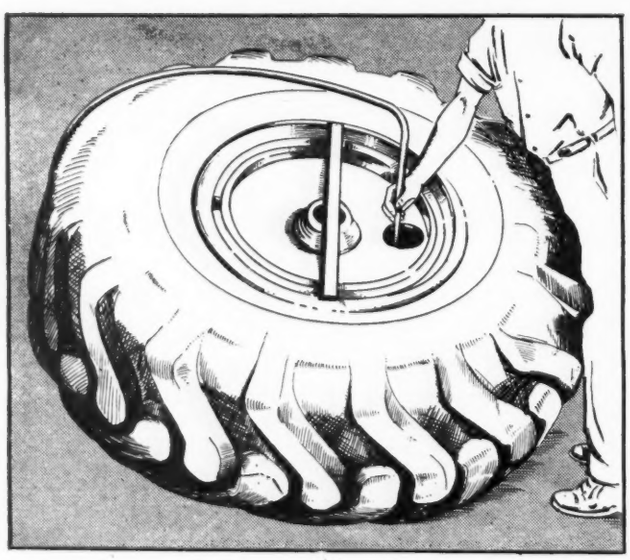
To OPEN a circuit breaker even before a fall of roof can dislodge and break a nearby trolley wire and thereby cause a short circuit, a No. 22 insulated pilot wire is hung on a line of cleat-type telephone insulators paralleling the trolley wire. The fragile wire is broken by the fall, thus opening the circuit breaker, said D. J. Baker, I-T-E Circuit Breaker Co., at the Dec. 8 meeting of the Coal Mining Institute of America, in Pittsburgh, Pa. Only too often when a trolley wire falls it does not cause a flow of current sufficient to throw the circuit breaker, but nevertheless furnishes the ground for a serious fire.

Many roof falls involve only small areas of slate, bringing down only a single trolley-wire hanger. The stress on adjacent hangers, however, is so great that the wire may be pulled free from several hanger clamps. The small pilot wire that controls the circuit breaker and receives energy from the trolley wire at the end of the heading will break when the roof falls, even where the fall subjects the wire to a tensile stress of somewhat less than 50 lb. per square inch. The interrupting of this small control circuit opens the circuit breaker controlling the power input to the section in which the trolley wire has fallen. The circuit breaker thus anticipates the short circuit about to result from the roof fall. The pilot circuit is so fused at the circuit breaker that the current will be broken at one ampere, and the circuit may have small pushbutton stations at intervals along its length, from which points in an emergency the circuit breaker may be caused to open. Details of the wiring arrangement may be studied in the chart below.



When a fall of roof breaks the pilot wire, the circuit breaker trips. That wire, being near the roof, is severed even before the trolley wire, so that when the latter wire falls the circuit breaker already has been de-energized and the trolley wire is harmless.

Lock Rim Kept in Place During Tire Inflation



PROTECTING WORKERS from injury resulting from the lock ring flying off the tire while it is being inflated is accomplished with a special tool developed by the scraper assembly section of La Plant-Choate Mfg. Co., Inc., and described in *La Plant-Choate Topics*. Across the face of the tool are printed the sobering words: "Use it and live." The tool consists of a strip of steel at the center of which is welded a cup that fits over the hub and is fastened to the wheel by three bolts. It holds the steel strip across the tire rim, thereby keeping the lock ring securely in place so that it cannot fly off.

The "Use-It-and-Live-Tool." The steel bar keeps the lock ring from flying off while the tire is being inflated.

Don't leave it to chance



IN ROULETTE—with the American wheel (two zeros) the odds against the player on even chances and numbers are 5-5/19 per cent. On the European wheel the odds are 1-13/17 per cent on even chances and 2-26/37 per cent on the numbers, and the odds against a number repeating itself 4 times is 1,679,615 to 1.

LEAVE IT TO— HY-TEST

THE SAFETY SHOE WITH THE ANCHOR FLANGE STEEL BOX TOE



...This flange adds extra strength to the steel arch's sidewall. Anchored between insole and outsole, it also serves to resist shifting and tilting when toe is struck at an angle.

One big reason more workers prefer Hy-Test Safety Shoes over all others is because of the Anchor-Flange Steel Box Toe. This rigid shield of lightweight steel (scientifically designed to stand up under greater pressure ... harder impact) certainly puts the odds with Hy-Test wearers when accidents occur. Workers wear Hy-Test Safety Shoes with pride, because all safety features are built-in so compactly, so smoothly, that it means much smarter lines. The quality leathers are formed over roomy, comfortable, scientifically designed lasts, and construction at every point meets rigid standards set by the world's largest shoe manufacturer. More Hy-Test Safety Shoes will be available soon. We will be glad to tell you about the special Hy-Test plan which gives on-the-spot safety shoe service to your workers. Drop us a line.

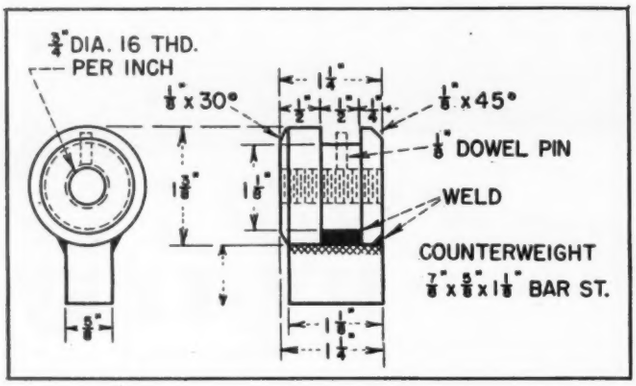
HY-TEST INTERNATIONAL SHOE CO. SAFETY SHOES

THE WORLD'S LARGEST SELLING SAFETY SHOE

HY-TEST *Safety Shoes*

HY-TEST DIVISION • INTERNATIONAL SHOE COMPANY • ST. LOUIS 3, MO.
EASTERN OFFICE • MANCHESTER, N. H.

Nut Change Betters Life of Forward and Reverse



ELIMINATING TWO ITEMS from repair stock and getting greater life from the forward and reverse units of 7BU loading machines resulted from an improvement made on the No. 5008-S trunnion nut by John Narbut, master mechanic, Banning No. 1 mine, Pittsburgh Coal Co., Van Meter, Pa. The new design is illustrated by the accompanying drawing.

Welding a weight on one side of the nut did the trick. Now adjustment is easy and gravity does the locking. The spring and ball of the original design were eliminated. The former gave trouble by breaking and the latter often worked out and got lost. Both freezing of the nut on the trunnion shaft (No. 5007-2) and loosening, which resulted in no adjustment of the clutch, were common faults of the original.

Weight on one side of nut replaced troublesome spring and ball.

Short Form Briefs Daily Data at Reels Cove

DAILY SUMMARY OF OPERATIONS
REELS COVE MINE

Date_____1945

Acc't No.	Labor	TODAY Men	TODAY Amount	TODAY Per Ton	TO DATE Men	TO DATE Amount	TO DATE Per Ton	Last Mo. To Date Per Ton
	Conv. Production							
	Conv. Moving							
	Conv. Rock etc.							
	TOTAL CONV. OPER.							
	General Inside							
	Rock Ydg. Dev.							
	Tipple Labor							
	Outside Labor							
	R. & M. Labor							
	TOTAL LABOR							
	MATERIAL							
	Mine Supplies							
	R. & M. Supplies							
	TOTAL MATERIAL							
	TOTAL LABOR & MATERIAL							
	FIXED CHARGES							
	Per Ton @ $0._____							
	Per Day @ $_____							
	% Mine Payroll @_____							
	TOTAL FIXED CHARGES							
	TOTAL COST							

		Today	To Date This Mo.	Last Mo. To Date
	Mine Cars Loaded			
	TONS PRODUCED			
	Tons Shipped			
	Inventory			
	Days Worked			
	Avg. Tons Per Day			
	Tons / Conv. Prod. Man			
	Tons / Man On Payroll			

Remarks:—

FORMS FOR REPORTING daily summaries of cost production for the benefit of operating officials should be brief and fit local conditions. Simplification is the keynote of the form worked out by George W. McCaa, superintendent of the new Reels Cove mine of the Tennessee Products Corp., to fit his conditions. This new property is completely described in the article beginning on p. 81 of this issue.

As shown in the accompanying reproduction of the form, daily labor costs are broken down into eight categories. The form also is designed to show figures to date as well as figures to the corresponding date of the previous month for comparative purposes. In addition, the form provides space for showing materials costs and fixed charges on all three bases, and is rounded out by space for days worked and production statistics.

The abbreviation "R. & M." on the form stands for "Repair and Maintenance."

This form presents in simplified fashion the daily summary of operation.

How to produce more coal *at less cost!*

USE *Bigger Cars* TO BOOST OUTPUT PER MAN

The production increasing possibilities of bigger cars can be shown by a simple calculation. If places made 30 tons, for example, and average time for car changing was one minute, total changing time for a place with 3-ton cars would be 9 minutes. (No time charged against last car because loader would move.)

If 10-ton cars were substituted, total changing time (3 cars) would be two minutes—a saving of 7 minutes per cut.

If the unit originally loaded but twelve places, the saving per shift would be 84 minutes—enough to move into and load two or three more places. With no change in the crew of 15, productivity per man would increase from 24 to 28 tons, assuming two extra places loaded; if one man were added to the crew, from 24 to 26.3 tons. • • • • (Excerpt from COAL AGE editorial, May 1945



In 1941 this West Virginia mine replaced 198 wood cars, 3-ton capacity, weighing 3,800 lb. each, with 60 U·S·S COR-TEN cars, 10-ton capacity, weighing 6,400 lb. each. Where they formerly hauled 24 wood cars per trip they now haul 12 COR-TEN cars—or in other words *48 more tons of coal and 7 less tons of deadweight per trip.*

BUILD THEM TO *Last Longer* WITH U·S·S COR-TEN

U·S·S COR-TEN High Strength Steel provides the ideal construction for large capacity cars, because it permits increases in size with the least increase in weight.

Such COR-TEN built equipment lasts longer because U·S·S COR-TEN—with a minimum yield point of 50,000 lbs. per sq. in.—is one and a half times stronger than plain structural steel. This in addition to its greater fatigue resistance, greater impact resistance and greater resistance to abrasion insures permanent toughness and stamina.

Add to this the fact that U·S·S COR-TEN has 4 to 6 times greater resistance to atmospheric corrosion and it is easy to see why COR-TEN cars stand up longer.

There's nothing new or untried about U·S·S COR-TEN. In 13,215 mine cars of all sizes and types—used by 55 large operators under widely differing conditions—U·S·S COR-TEN construction has been consistently successful. Though some of these cars have been in service for more than 10 years, not a single failure due to wear has been reported.

If your cars are worn out, need frequent repairs, or are too small to utilize the full productive capacity of your mechanical loaders, get the facts about U·S·S COR-TEN before you replace them. They will last longer, built stronger with COR-TEN.

USS HIGH STRENGTH STEEL UNITED STATES STEEL

AMERICAN STEEL & WIRE COMPANY, *Cleveland, Chicago, New York* • COLUMBIA STEEL COMPANY, *San Francisco*
CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago* • NATIONAL TUBE COMPANY, *Pittsburgh*
TENNESSEE COAL, IRON & RAILROAD COMPANY, *Birmingham*
United States Steel Supply Company, Chicago, *Warehouse Distributors*
United States Steel Export Company, New York

UNITED STATES STEEL

Electric Soldering Faster



ELECTRIC SOLDERING EQUIPMENT cuts the soldering time in half on armature work, says H. E. Arner, electrical engineer for the Lehigh Navigation Coal Co.'s Central Repair Shop, Lansford, Pa.

The Ideal Model 100 soldering outfit, shown in the accompanying illustration, is handier and faster to use than the old furnace-heated soldering irons. The wartime use of 80-20 solder requires more skill on the part of the armature winder, but the electric method of soldering helps to overcome this handicap.

The equipment operates from a 115-volt 25-cycle supply and draws about 30 amp. One secondary lead is connected to all the commutator segments through a copper band that encircles the commutator. The other lead is manipulated by the repairman. Touching the carbon to the riser heats the riser and solder is added as needed. This method tends to minimize the wasting of solder.

Elvin Bittner, armature winder, uses the electric equipment to solder the risers of the armature that he has rewound.

Construction Hoist Kept for Conveyor Maintenance

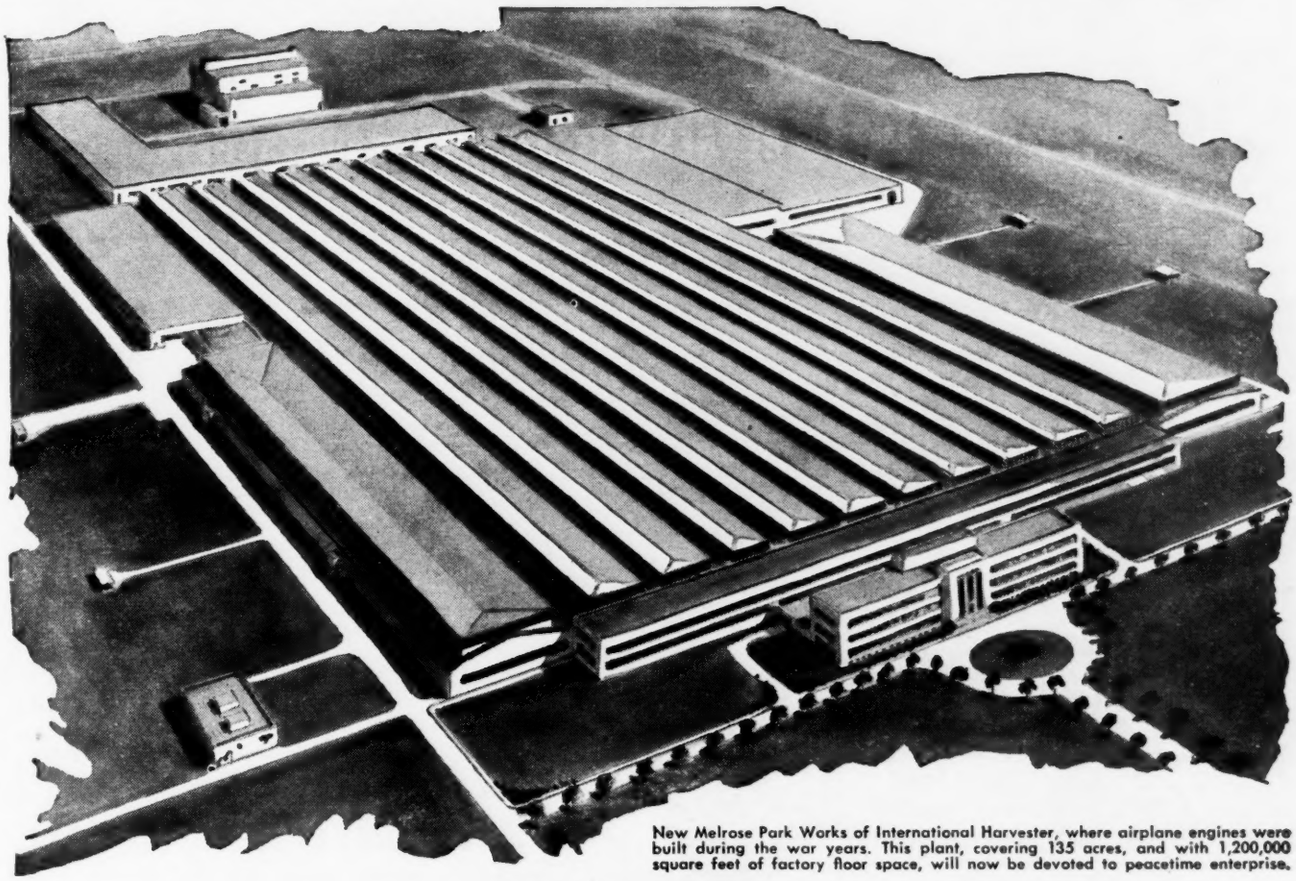
STEP BY STEP the maintenance of mining equipment moves closer to the top among the principal problems engaging the attention of company executives and mine superintendents. Too often in the old days operating maintenance was given little or no consideration in design and construction of a plant. An illustration of the change for the better is to be seen along the gallery of a rope-and-button conveyor at the new Reels Cove mine of the Tennessee Products Corp., Whitwell, Tenn.

To facilitate construction of this conveyor a wooden-rail track was installed on the walkway and an electric hoist was used to handle a small car carrying men, materials and tools. Instead of the usual procedure of disposing of this equipment when the job was done, the wooden rails, car, rope and hoist are being kept intact for maintenance jobs that may arise on the conveyor.



The wooden rails and the rope and head sheave of the maintenance hoist show along the walkway of the rope-and-button conveyor gallery.

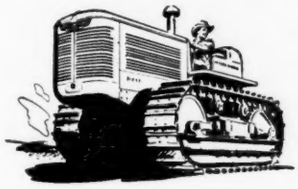
A GREAT NEW PLANT



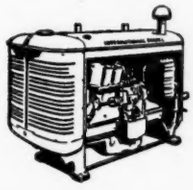
New Melrose Park Works of International Harvester, where airplane engines were built during the war years. This plant, covering 135 acres, and with 1,200,000 square feet of factory floor space, will now be devoted to peacetime enterprise.

For Building

IH INTERNATIONAL POWER







• International Harvester has added the giant Melrose Park Works, on the outskirts of Chicago, to the facilities of the Industrial Power Division. Purchase of this plant makes it possible to save many months in getting the expanded lines of International Crawlers, Industrial Wheel Tractors, and Diesel Engines into production. It will also help provide unsurpassed capacity for research and manufacture of International Industrial Power—power that's designed for your needs. Melrose Park Works, plus Tractor Works, Chicago, and Milwaukee Works, will now be at your service, producing power for postwar industry and construction.

Great things are coming in International Power. A new and tremendously powerful Diesel crawler tractor, the huge TD-24, is just one of the new developments that will be offered to industrial power users. New and improved Diesel power units are to be added to the present International line.

As in the past, you can look with confidence to International for the most advanced engineering in industrial power equipment.

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Industrial Power Division

INTERNATIONAL HARVESTER COMPANY

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Hardened Eccentric Pin is designed so it can't turn in block . . . puts joint wear between pin and insert.

Long life, replaceable, hardened alloy steel Connector Insert gives new factory joint accuracy to a worn connector.

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IN every important mining region, you will find a representative of the Cincinnati Mine Machinery Company at your service. They know and understand the engineering and design behind Cincinnati Chains, double-ended reversible Bits and sturdy Cutter Bars and can offer valuable advice. They will be glad to be of assistance. If you are not now using Cincinnati Time Tested Duplex Chains and time saving easily set Duplex double-ended reversible Bits, it will be worth your while to call a representative to discuss your cutting problems.

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News Round-Up



Union Heads Call Wage Policy Talk

District presidents of the United Mine Workers of America issued a call Feb. 21 for a meeting at Washington, D. C., March 11 of the union's policy committee of 250 to consider wage demands on bituminous coal operators. U.M.W. President John L. Lewis presided at the meeting of the district leaders, which lasted two days.

The existing contract, which may be terminated on 30-day notice or upon a change in government policy, calls for advance notice of ten days for a joint meeting, provides for 15 days of negotiations, after which either side may end the contract in five days.

While there is lively speculation on what the nature of the union demands will be, the operators asserted that "take-home" pay increases since January, 1941, are far above the 33 percent rise in living costs. They point out that $1 to $1.40 was added to the basic rates after Jan. 1, 1941, making a pay scale of about $7 a day for all miners, North and South. Then approximately $1.25 to $1.30 was added for travel time and other items, bringing the scale to from $8.25 to $8.30. On top of this was added also a sixth day at overtime rates, so that earnings of bituminous coal workers now are said to be averaging $58.20 weekly for an average of nearly 46 hours a week, according to the Bureau of Labor Statistics.

Besides maintaining that the men have not had an increase in basic rates since 1941 the union also is expected to renew its demand for a contract to include the foremen and supervisors and for a royalty of 10c. a ton to cover medical expenses.

Testifying before the Senate Labor Committee at the opening of hearings on the legislation sponsored in the House by Representative Case (R., S. D.), spokesmen for southern coal operators on Feb. 22 urged prompt Senate approval of the strike-control measure. Edward R. Burke, president of the Southern Coal Producers' Association, said that "the heart of the Case bill" was a provision denying legal status to unions of foremen and other supervisory workers who did not perform manual productive labor.

William Green, president, American Federation of Labor, characterized it as a "monstrous bill" and said that the A.F.L. would "fight it and oppose it uncompromisingly with all our collective and political strength."

The wage-scale convention of District 5, United Mine Workers of America, ended at Pittsburgh Feb. 16 with the demand for a 35-hour, five-day week at the same pay now received for 48 hours and six days. The delegates stressed repeatedly that they would support John L. Lewis, "no matter what his demand will be."

Approval also was given to resolutions for higher vacation pay and for a renewal of the demand for a royalty of 10c. for every ton of coal mined. This royalty would be paid by the coal operators into the U.M.W.A. benefit fund. Fear of rapid mechanization of mines drew resolutions that each mine unit consist of a specified number of workers. Delegates charged that, otherwise, many workers now employed would lose their jobs.

It also was urged that the problem of seniority be ironed out. Veterans, the delegates held, should receive credit for time in the armed services, but they should not replace workers with greater seniority. About fifty resolutions on mine safety precautions were offered.

One proposal, that of extending the tenure of officers from four years to six years during the next term, threatened to disrupt the five-day meeting. The suggestion was dropped in the face of strong opposition.

Meeting in special convention at Springfield, Ill., the Progressive Mine Workers voted unanimously Feb. 26 to leave the American Federation of Labor. The break was precipitated by A.F.L. acceptance of the United Mine Workers back into the fold. P. M. W. had been affiliated with A. F. L. since 1938. With a present strength of 35,000 members, P. M. W. was organized by former U. M. W. members two years after their union quit A. F. L.

Producers Announce New Plants

A new underground truck mine, two miles north of Chandler, Ind., The Three Coal Co., owned and operated by James W. Hargrave, Sylvester C. Mitchell and Ralph Hargrave, started producing Jan. 19. Operating six days a week, with about 50 men, capacity output will be 1,000 to 1,200 tons



"I'll venture a guess that this will be your first day of work in a coal mine. Am I right, young fellow?"

daily. An up-to-date oak tipple, steam-operated, equipped with shaker screens and self-dump hopper-bottom bins will prepare mine-run, lump, nut, stoker and screenings. A steam-heated bathhouse with hot and cold water and concrete floors, has been provided for the convenience of the employees.

Eastern Gas & Fuel Associates, Koppers Coal Division, has taken over operation of the Eccles mining properties, 10 miles west of Beckley, Raleigh County, W. Va., on lease from the Crab Orchard Improvement Co. The Eccles property includes nearly 9,000 acres of coal land from which about 1,000,000 tons of coal now is mined annually.

The new operator already has begun plans for improvement of the community, the mining operations and the surface facilities, details of which will be announced as soon as plans have been completed. There are two Eccles mines: No. 5 mine, in the Beckley seam, and No. 6 mine, Sewell seam. The mines are located on the Virginian and the Chesapeake & Ohio Rys.

Frank D. Beale, president, Loup Creek Collieries Co., reports, that the company has purchased the entire stock of the Crab Orchard Improvement Co. Beale, who also is president of the Virginian Ry., said Eastern Gas & Fuel Associates, which recently took over operation of the Eccles mines, would continue to operate them.

Rochester & Pittsburgh Coal Co., Indiana, Pa., spent $175,000 late in January for coal lands in Cambria County, Pennsylvania, and will spend more than $1,000,000 more in improvements in the next two or three years. R. & P. purchased about 1,000 acres and leased 3,000 additional acres. It acquired the holdings of the Big Bend Coal Mining Co., tapping the "B" seam, at Twin Rocks, the purchase including tipples, rail sidings, 25 houses and offices. Some of the land was owned by the A. V. Barker estate and the deal included 800 acres from the latter. The land leased is owned by the Manor Real Estate & Trust Co., a subsidiary of the Pennsylvania R.R. The terms of the lease provide for payment on a royalty basis. The mine now employs 100 men, but R. & P. plans to employ 500 and increase daily production from about 450 tons to 2,000.

Raven Coals, Inc., which is associated with the Raleigh Smokeless Fuel Co., Beckley, W. Va., is opening a mine to develop 3,000 acres of coal land at Muddlety, Nicholas County, W. Va.

•

Elk Horn Seeks to End Receivership

Elk Horn Coal Corp., operating in Letcher and Floyd counties, Kentucky, has filed a petition seeking termination of its receivership, in effect since August, 1940. Howard N. Eavenson, Pittsburgh, Pa., and W. W. Goldsmith, Charleston, named receivers by the Kentucky court, have since been serving. In recent years, the receivers reported, they have been making money. It is announced that improvements and extensions are contemplated at Hemphill.

Russia Plans to Make Donbas Largest Coal Producer in Europe

Moscow (Cable to Coal Age From Moscow Bureau, McGraw-Hill World News Service)—The Russian Government has completed plans for full exploitation of one of the Soviet Union's mining prizes—the Donbas, with its 89,000,000,000 tons of coal. In a program designed to make the Donbas the leading coal producer of Europe—outstripping output of the Ruhr—the Russians plan to drill 300 new major pits in the Voroshilovgrad, Stalino and Rostov districts. By 1960, according to officials of the People's Commissariat of the Coal Industry, the annual yield from this rich basin is expected to be 200,000,000 tons—nearly double prewar production.

North of the Sea of Azov, in the southeastern corner of the Ukraine, the Donbas (Russian contraction of Donets Basin) was badly mauled in the war. The Germans destroyed 1,135 collieries. In a spectacular comeback, the Russians already have succeeded in putting more than 50 percent of the mines back in operation. Production for 1945 doubled that of 1944. Engineers estimate that it will be another two years, however, before the prewar level is reached.

When the Donbas, which produced three-fifths of Russia's peacetime coal, was overrun by the Nazis in 1941, Soviet economy was badly hit, and might have collapsed completely had it not been for the newly developed Kuznetsk coal basin, in the east. But despite Russia's tremendous recuperative powers—which has witnessed the country catching up with its total prewar annual production of 165,000,000 tons—the U.S.S.R. is still far from meeting the needs of industry. Moscow newspapers recently launched a campaign demanding a production increase, pointing out that the full needs of the iron and steel industry for coke is not being met and that power plants have insufficient coal reserves.

As a step in the direction of streamlining operations to increase production the government has ordered the People's Commissariat of the Coal Industry broken up into two sections—one for the control and operation of mines and coal-machinery construction in the western areas of the country, and another in the east. The western division is being headed by D. G. Onika, former vice commissar of the coal industry, while V. V. Vakrushev, the former coal commissar, heads the eastern section.

Even before the war, Russia's total output of fuel lagged behind the country's growing requirements. The Soviet's per capita coal production in 1940 amounted to 1.5 tons compared with 5.6 tons in Britain and 7.4 tons in the United States.

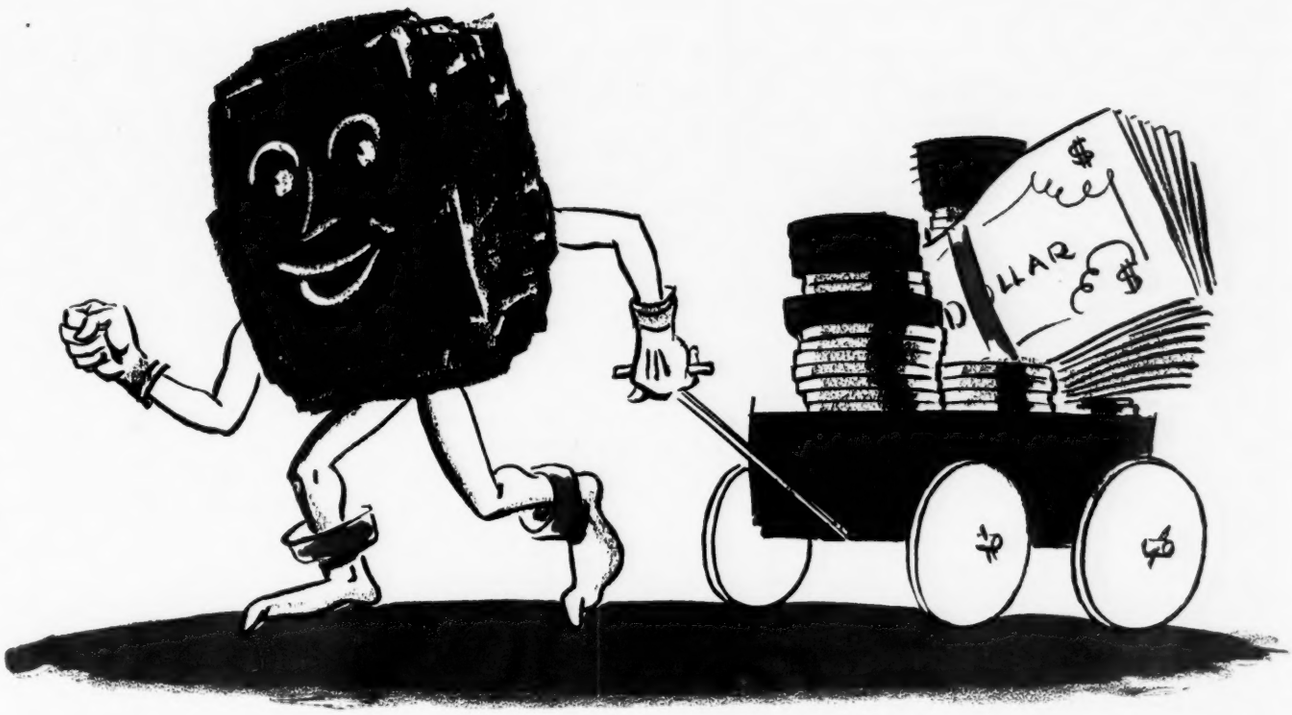
The fourth Five Year Plan, details of which have not as yet been announced but which already is in operation, envisages the expansion of many fuel-absorbing industries such as iron and steel, non-ferrous metals, machine building, chemical and silicate industries, and railway transport. The further mechanization and electrification of industry and transport, plus better living condition standards, will further tend to drain coal reserves.

In view of all these things, it will be imperative that the coal industry expand during the fourth Five Year Plan at a greater rate than any other Soviet industry. The problems facing the two coal commissariats are entirely different. The main task in the western area is the rehabilitation of the Donbas, whereas the problem in the east is to step up production.

Although engineers have done a remarkable job in getting the war-wrecked Donbas back on its feet, there have been complaints, bitter and loud, that the work is not proceeding fast enough and that the slowness of restoration is handicapping the rehabilitation of Russia's mighty iron and steel industry in the South.

Weaving through the wheat fields of the treeless, monotonous 10,000 square miles of





Does your coal bring in all the dollars it should?

There are different ways to sell coal—

One is to produce mine run, or the sizes you like to make, and sell where you can for what you can get.

Another is to examine the market within your logical sales area and find out the sizes and kinds of coal best suited to the burning equipment of your probable customers. Then prepare your coal to match the market, and in your merchandising magnify the qualities of your coal which are most appealing to that market.

This process might mean a revision of your preparation methods and sales technique . . . *but, your coal will bring more money because it's tailored to your market.*

One kind of selling uses the hit-and-miss method of the peddler . . . the other is *sales engineering* calculated to match the best modern methods of coal production.

Good *sales engineering*, the kind that can produce sufficient revenue to amortize the cost of modern coal producing machinery, requires a real investment in trained personnel . . . sales engineers. You can get this kind of service at a relatively low cost per ton by making a permanent connection with a good coal sales company.

AMERICAN COAL Sales ASSOCIATION

AMERICAN COAL *Sales* ASSOCIATION . . . Washington, D.C.

plateau that is the Donbas is the densest railway network in the Soviet. All these lines, plus the Moscow and Leningrad industrial districts, depend on Donbas coal. The iron and steel mills and the metallurgical and chemical plants of the Southeast Ukraine need the basin coal before they can carry on their expansion plans.

Although the attention of the Commissariat for Coal for the western areas is being directed at the Donbas, other mining centers, small by comparison, are not being overlooked. The Moscow coal basin, although devastated during hostilities, already is producing 16,000,000 tons annually, or double the prewar output. The great advantage of this basin is its proximity to central areas of Russia, eliminating long-distance hauling. Other important coal areas under the same commissariat include Tkvarcheli and the Tkvibuli collieries, in Georgia; Borovichi brown-coal area, east of Leningrad, and the West Ukrainian brown-coal area, near the Prut River Valley.

Russia's eastern coal areas apparently are destined for even a greater future than previously. It is no accident that the former commissar of the coal industry was appointed to head the expansion in the east. As a matter of fact, it was Vakrushev who was responsible to a great extent for the wartime development of coal in the eastern area—which contributed largely to victory by meeting all the needs of Russia's war industries at a time when the Germans had overrun the Donbas.

The increase in coal output of the eastern region between 1940 and 1944 exceeded 25,000,000 tons. The eastern area includes the Kuzentsk fields, whose deposits are estimated at 450,000,000,000 tons—the world's largest outside of the Appalachian fields of the United States.

Ranking in output next to that of the Donbas, the Kuznetsk fields produced 25,000,000 tons in 1940, or one-third of all Russian coal obtained outside the Donbas. Twenty-six per cent of Kuznetsk coal is suitable for coking. In June, 1945, the daily Kuznetsk yield was 35 percent more than the prewar percentage, and coking-coal output had been doubled. In 1945 Kuznetsk yielded 2,000,000 tons more coal than in 1944. The large number of new mines under construction is expected to boost the Kuznetsk coal output by 50 percent by 1950.

The Karaganda coal fields, feeding Kazakhstan's new industries, in 1944 doubled its prewar annual production of 4,000,000 tons. The Ural mines, which include the Kizel coal field, northeast of Perm, and the brown-coal fields at Yegorshino, east of Desverdlovsk, and also the Chelyabinsk coal fields, likewise have doubled their prewar output and are now producing 18,000,000 tons annually. Six new coal deposits are being prospected in the Kizel Basin, and the findings have been so gratifying that 30 new mines are expected to be sunk there during the fourth Five Year Plan. It is estimated that this will boost output by 40 percent.

West of the North Urals at the 68th parallel in the Pechora River Basin lies the Vorkuta-Pechora coal field—the northernmost of Russia's great coal deposits. Its estimated coal reserves of 120,000,000,000 tons are greater than those of the Donbas and yield coal easy to coke. As production was considerably expanded in the war, it now occupies an important place in Soviet economy—especially since the 1,100-mile North Pechora Ry. has been completed, linking Vorkuta with Cutlas-Konosha, and thereby with Russia's railway system to the west. The construction of a railway running to the southeast is provided for under the fourth Five Year Plan, and this is calculated to provide a speedy supply of Echora coking coal to the Ural metallurgical plants. Exploitation of the latter deposits began in 1932, and during the war years seven times more coal was produced there than the total prewar production. Seventeen mines are operated there now, and 26 more pits are at varying stages of construction.

The eastern areas include a number of smaller deposits already operating and scheduled for considerable expansion. Their chief function is to satisfy the needs of local industry, thereby eliminating costly long-distance hauls.

In the Kazakhstan, in addition to the Karaganda fields, coal mines have been exploited at Mangyshlak on the Caspian; southeast of Chikment; near Pavlodar; and near Karsak-Pai.

In Kirghizia, mines located in the center of the Republic yielded 1,500,000 tons in 1939. No later figures are available. The Uzbekistan coal fields, discovered at Angren, near Tashkent, are of great potential importance. To date, they hardly have been tapped, but important news can be expected from the Usbekistan in the future.

Coal now is being mined in the Lower Tunguska and Koreika valleys on the Central Siberian plateau. Production took a wartime spurt also in the southern Siberian mines near Irkutsk, in the Cheremkhovo Basin. Brown-coal-mining operations are going on in the Krasnoyarsk region near Achinsk and Kansk, and regular coal is being produced near Minusinsk.

In eastern Siberia coal is being mined near Listvyanka, in Irkutsk province, and also at Bykachacha, in Chita province. Far Eastern mines are in operation near the southern end of the Zeya Valley, between Svobodni and Blagoveshchensk, and also at several points along the Burneay Valley near Manchuria, in Sakhalin, Suchan, and Ugolnaya.

The greatest problem facing the Soviet coal industry is the shortage of manpower and equipment—especially the latter. The Russians are bending all their energies toward the production of coal machinery, and simultaneously are trying to attract workers by building dwellings for them and generally trying to make living conditions for miners as attractive as possible.

The machine-building plants of the commissariats for the coal industry are working full blast, trying to catch up with demands. Some of the war plants have been converted to the manufacture of conveyors, boilers, pumps, coal cutters, coal-loading machines, cable winches, and combined heading machines.

COAL ACTIVITY

Bituminous Coal Stocks

	Net Tons Jan. 1 1946	P.c. Change From Dec. 1 1945	P.c. Change From Jan. 1 1945
Electric power utilities	14,668	− 3.1	−10.0
Byproduct coke ovens	4,804	+ 4.3	−23.8
Steel and rolling mills	594	− 1.3	−15.1
Railroads (Class I)	8,980	−10.7	−30.5
Other industrials*	13,400	− 6.6	−18.4
Total	42,446	− 5.0	−19.0

Bituminous Coal Consumption

	Thousands of Net Tons Dec. 1945	P.c. Change From Nov. 1945	P.c. Change From Dec. 1944
Electric power utilities	5,804	+ 5.9	−17.8
Byproduct coke ovens	7,333	+ 7.9	− 8.2
Steel and rolling mills	922	+13.7	− 9.8
Railroads (Class I)	10,999	+11.4	− 6.7
Other industrials*	13,382	+15.2	− 4.3
Total	38,440	+11.1	− 7.3

* Includes beehive coke ovens, manufactured-gas plants and cement mills.

Bituminous Production

January, 1946, net tons	54,100,000
P.c. change from January, 1945	+2.5

Anthracite Production

January, 1946, net tons	5,045,000
P.c. change from January, 1945	+20.2

Sales, Domestic Stokers Vs. Oil Burners

	Stokers	Burners
December, 1945	13,746	
P.c. change from Dec., 1944	+183.5	
January-December, 1945	126,178	
P.c. change, from Jan.-Dec., 1944	+227.1	

Index of Business Activity*

Week ended Feb. 23	144.0
Month earlier	150.5
Year earlier	231.3

* *Business Week*, March 2.

Electric Power Output†

Week ended Feb. 23, kw.-hr	3,922,796,000
P.c. change from month earlier	−2.7
P.c. change from year earlier	−12.3

† Edison Electric Institute.

Strip-Mine Tax Plan Being Studied in Ohio

Consideration of recommendations to be made to the Legislature—of which a severance tax on minerals may be one—was to be begun Feb. 28 by the State strip-mining commission of Ohio. The body was expected to recommend a tax program that would permit communities extensively stripped to maintain an economy insuring continued existence.

Dr. Wilber Stout, State Geologist, suggested to the commission an appraisal of the State's land to find out what it is best suited for. "You must find out what kind of land it is," said Dr. Stout—"whether it is farm land, forestry land or mineral land, before you know what to do about controlling strip mining." He added that the minerals under some of Ohio's so-called poor counties held untold wealth that far exceeded the value of the land for raising crops.

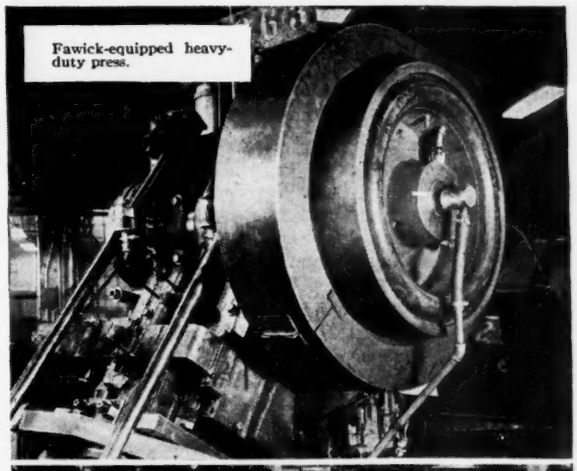
Jackson County coal operators have organized the Strip Mining Study Association of Southern Ohio and elected James J. McKitterick, Jackson, as president; Howard Morgan, Oak Hill, secretary; and J. W. Potter, Jack-

HOW WELL DO THEY WORK? HOW MUCH DO THEY COST?

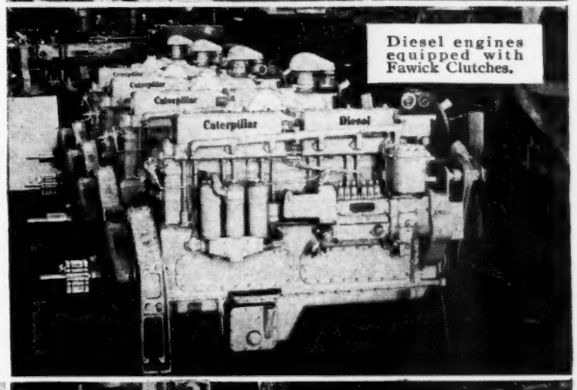
Both of these important questions about Clutches for heavy-duty drives are answered—*in your favor*—by Fawick Airflex Clutches.

1. They absorb shock and vibration, and transmit power, through a cushion of air—just like your car rides on its tires.
2. They have no moving parts to wear or get out of adjustment—no springs, toggles, arms or levers.
3. They require no lubrication—maintenance costs are low.
4. They provide uniform clutch engagement under all loads, at all speeds.
5. Performance and economy have been proved—on thousands of navy ships and on hundreds of types of industrial applications.

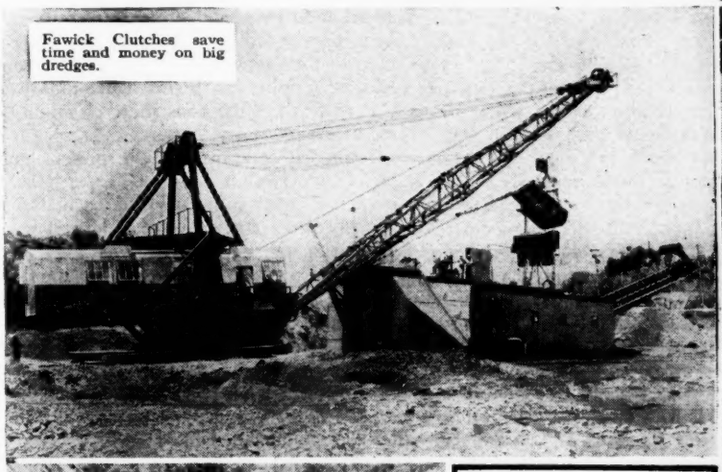
Let our Engineering Department give you details—on clutches, slip clutches, brakes, flexible couplings and power take-offs.



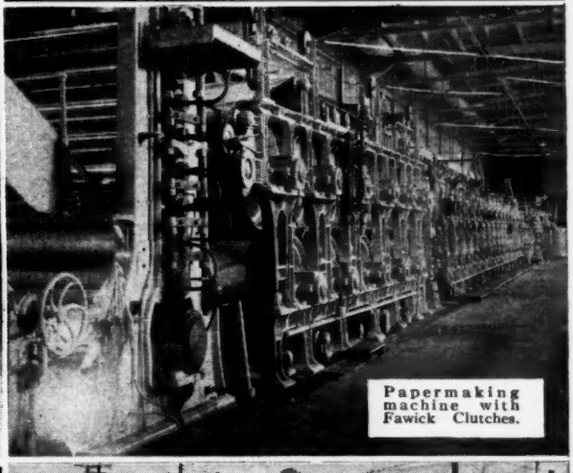
Fawick-equipped heavy-duty press.



Diesel engines equipped with Fawick Clutches.



Fawick Clutches save time and money on big dredges.



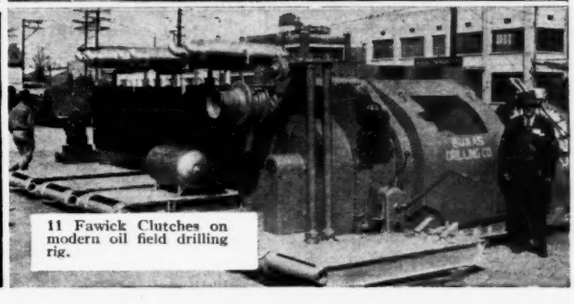
Papermaking machine with Fawick Clutches.



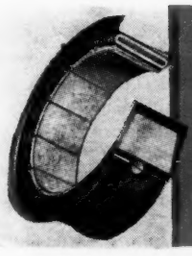
Fawick-equipped logging crane.



How the FAWICK AIR-FLEX CLUTCH Works. Compressed air expands the rubber-and-fabric gland—to engage clutch with any degree of "grip" you want. Release the air and clutch disengages.



11 Fawick Clutches on modern oil field drilling rig.



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son, treasurer. The purpose of the organization is to study proposed legislation affecting strip-mine interests.

Strip mining threatens to ruin Piedmont, Clendenning, Tappan, Leesville and Atwood lakes, five of the most attractive scenically in the Muskingum Valley Conservancy District, the strip-mine study commission was informed Feb. 14. A letter from Bryce C. Browning, New Philadelphia, secretary of the conservancy district, informed the commission that the lakes were endangered by stripping operations in Harrison and other eastern Ohio counties.

Mr. Browning said that an appraisal of the lakes' value for public recreation based on tables supplied by the National Park Service indicates it would be around $800,000 a year. "On the basis of present interest rates," he said, "this would seem to represent a gross value of between $30,000,000 and $40,000,000."

Four coal companies and 14 individuals, all connected with coal-stripping operations in the vicinity of Madisonville, Ky., have been indicted by the Hopkins County Grand Jury. Circuit Judge H. F. S. Bailey said the charge in each case was maintaining a nuisance, which he said was based on alleged property damage and annoyance to citizens because of heavy blasting. Listed in the true bills are: Homestead Coal Co., Sentry Coal Mining Co., Chandler Coal Co. and the Mauger Construction Co.

Seventy-five thousand trees are to be planted experimentally on strip-mined land in Harrison County, Ohio, as soon as weather permits, according to A. G. Linstrom, of the Central States Forest Experiment Station of the Forestry Service of the U. S. Department of Agriculture. The work is being done under a grant by Congress of $50,000 for research in the reclamation of strip-mined land. The project will be carried on by Linstrom and R. G. Lane, also of the station, in cooperation with the Ohio Reclamation Association. The U. S. Soil Conservation Service also will have a part in it.

Initial surveys—mapping of the entire strip-mining area, selection of sites and evaluation of site conditions affecting tree growth—have been completed. Included in the surveys were tests to determine the quantity of rainfall retained in the soil on three types of land: untouched land, land that has been mined by the open-pit method and land that has been leveled after mining had been completed.

Land and labor for the experiments are being furnished by the Ohio Reclamation Association, an independent organization financed by coal operators. The trees will be planted as nearly as possible in equal numbers of conifers and hardwoods in locations having identical growth conditions, on land both above and below the soil banks as well as on them.

A plan to create game refuges on the strip-mine spoil banks of southeastern Ohio is being promoted by the Eastern Ohio Reclamation Association and the State Division of Conservation and Natural Resources, it was revealed Feb. 21. H. A. Rider, conservation commissioner, was invited by the coal strippers to make an inspection of the spoil-bank area and pick out the sites where the refuges would be located. Under a tentative program outlined by Mr. Rider to Alan R. Davidson, president of the reclamation association, the State would furnish blueprints indicating the location of the refuges and the coal operators would agree to follow the divisions's plan.

•

Koppers Camps Break Records

With a total enrollment of 884 at the two summer camps maintained for the children of Koppers Coal miners by Eastern Gas & Fuel Associates, all previous attendance records were broken, according to a report by Thomas E. Lightfoot, director of welfare for Koppers Coal.

The four two-week camping periods for white children at Camp Thomas E. Lightfoot, Hinton, W. Va., were attended by 756. There were 128 who participated in the three camping periods for negro children at Camp Wyndal, Gauley Bridge, W. Va.

Kopperston mine was first in total representation, with 92 white children in attendance. Keystone mine was second, with 91. Keystone mine was first in the number of negro children from that mining community, with 26. Carswell mine was second, with 25.

The camps are maintained for the children of all Koppers Coal miners. They pay $7 for two weeks of camping, including private bus transportation to and from their homes in 23 mining communities in West Virginia, Pennsylvania and Kentucky. The camps are operated by Koppers Recreation Camps, Inc., a non-profit corporation of which L. C. Campbell, vice president of Eastern Gas & Fuel Associates, Koppers Coal Division, is president. The camps are under the personal supervision of Mr. Lightfoot, who also heads the Koppers Coal Home Nursing Service, an organization of registered nurses maintained by Koppers Coal to provide year-round nursing service to the families of miners in their home communities.

Camp Lightfoot was started in 1935 with an enrollment of 73 children. Camp Wyndal was started in 1939 with 23 children. Since the two camps were opened 5,816 children of Koppers Coal miners have had the advantage of the recreational and health-building facilities provided.

•

Illinois Mines Have Best Safety Year

In 1945 Illinois miners established the best safety record in the history of the State, according to Robert M. Medill, director of the State Department of Mines and Minerals. Nearly one million tons of coal was mined for every fatal accident in the State. A total of 69,500,000 tons of coal was produced and there were 70 shipping-mine fatal accidents for the year.

For 1944, Medill said, there were 87 fatal accidents and a total of 77,400,000 tons of coal was produced.

Japanese Coal Output Begins to Recover

TOKYO—Emergency makeshift measures are getting Japanese coal production out of its slump and progressively increased output is predicted by military authorities though against continued great odds. Something over a million tons, about one-fifth a good month's pre-war production, was made available for use in Japan in January. Only 800,000 tons was mined, but 320,000 tons had accumulated at the pitheads. Of the total, about 88,000 tons had been earmarked in advance for shipment to China and the Philippines.

The manpower situation, made critical when Chinese and Korean slave laborers fled after the Jap surrender and later when about half the Japanese miners wandered off in search of food, has been improved by employment of student volunteers.

Further work incentive has been provided by granting more adequate ration and wage schedules, including food allowances for dependents.

Military authorities have been releasing mining explosives from seized stocks in quantities that should be sufficient to get production back to pre-war levels. By the turn of the year, 1,119 tons of explosives in addition to fuses and other accessories have been distributed to the mines. A shortage of wire rope now will have to be overcome because supplies for the first three months of this year fall 3,000 tons short of minimum requirements.

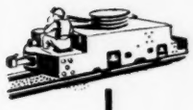
Remedial measures for the present must be of a makeshift nature. Proper rehabilitation of many mines will take a matter of years because of reckless and inexpert working during the war.

The plight of Japanese industries in the present coal situation as indicated by latest allocations approved by the military emphasize the fact that even minimum recovery depends on the success of current measures to improve mining operations. Even with 40 percent of the January supply, or about 410,000 tons, the railroads, which formerly absorbed only 10.5 percent of total production, have insufficient fuel to meet operating requirements.

The chemical industries, which absorbed 500,000 tons per month in 1937, got a mere 65,000 tons and that for fertilizer production only. Gas works were alloted 42,000 tons, compared to 190,000 before the war, and heavy industries are required to manage on 3.9 percent of current supply compared to 21.5 percent in 1937, and that includes an allocation of 28,000 tons for iron foundries.

Japan's war effort was already being crippled by coal shortage when the first atomic bomb was dropped on Hiroshima. Production in the early months of last summer had dropped from monthly averages of 4.1 million tons in 1944 and 4.8 million in 1945 to 3.4 million and in the eventful month of August pit returns were only 600,000 tons.

Output got up to 900,000 tons in September but reached a new low of 540,000 tons in October. By December, coal supplies to the railroads fell below operational



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minimum, immobilizing 60 percent of the rolling stock and causing great difficulty in hauling coal from the pitheads. City gas production was suspended, although metallurgical coking was maintained to some extent to keep ovens fired. Blast furnaces and non-ferrous smelters, already reduced to fractional operations, stopped production and the chemical industries were compelled to shut down.

•

Anti-Smoke Studies Proceed Steadily

Mayor Thomas A. Burke of Cleveland appointed Feb. 6 a 39-member citizens' committee on air pollution. Although this was only one of a long series of moves by various city administrations to do something about the city's smoke and fumes, the mayor was optimistic that the new group could find answers that have eluded predecessors. His optimism was mainly based on the personnel of the committee, including leading representatives of industry, real estate organizations, civic groups and railroads, as well as professors and housewives.

Burke said the first meeting of the committee was to be held Feb. 13 at the Hotel Statler, with Warner Seely, executive vice president, Warner & Swasey Co., chairman of the group, presiding. Among those present at the organization meeting was to be Eugene D. Benton, fuel engineer, Louisville & Nashville R.R., described by Mayor Burke as "one of the country's leading combustion engineers."

Other members of the committee are Prof. F. H. Vose, Prof. C. F. Prutton, Prof. H. S. Booth, William E. Malm, Frank S. Chopp, Mrs. U. V. Portmann, Earl Wescott, Mrs. John Oertel, Mrs. E. E. Bubb, Mrs. Walter Magee, H. R. Klepinger, R. B. Textor, Carl E. Moore, William Kammerer, Ernest J. Bohn, R. J. McSoley, John H. Rohrich, Wilson Leece, Walter D. Lhamon, John P. Freeman, William E. Johnson, William Davey, J. W. Lerner, Rev. Emil N. Kraft, J. B. Grigg, Charles Oswald, Sherwood Parsons, J. Dean Halliday, Leonard Smith, Owen M. Fox, Thomas Marsh, Karl Kaserman, A. P. McGrath, L. C. Sabin, Guy H. Mahan, Mrs. George J. Mateja, Dr. B. G. Gebhardt and G. W. Hannekan.

H. B. Lammers, director of engineering for the Coal Producers' Committee for Smoke Abatement of Cincinnati, suggested Feb. 6 that the Association of Power Engineers appoint a committee to study smoke-abatement measures, including equipment for stokers and boilers.

"Inability on our part to eliminate smoke, fly ash and other atmospheric pollution is a direct reflection on our ability as engineers," Mr. Lammers declared. "If smoke is due to the inefficient and uneconomical combustion of fuel it naturally follows that we are interested in this phase because we are concerned with the saving that might be effected. Furthermore, if we assume the responsibility of engineers it becomes our duty to eliminate smoke because it is caused by inefficient and uneconomical combustion."

City officials of Akron, Ohio, are hoping that the days of smoke nuisance are numbered as they await word from Cincinnati on results of the survey made by 14 engineers headed by Mr. Lammers. The engineers took reports on 230 of the district's heating plants. These, together with a general survey made by Lammers, will be used in a comprehensive study of Akron's smoke problem. The report is to be ready soon.

Meantime officials discussed plans for a district-wide educational program aimed at eliminating smoke wherever possible. Marvin Davis, city service director, said he was contemplating calling out former civilian defense workers to back the campaign against smoke. The program will start as soon as the engineers' committee is heard from.

Nearby cities in southern Illinois are to be made individually responsible for carrying on their own fight against the smoke nuisance, it was decided at a meeting of the Area Smoke Abatement Committee held Feb. 5 at the First National Bank Building, East St. Louis, Ill. An executive committee of seven named to cooperate with communities in the area in smoke eradication includes A. C. Johnson, president, First National Bank of East St. Louis, chairman of the area smoke-abatement committee, who also will head the executive committee; E. F. Wagner, Granite City, Ill., president, Tri-Cities Chamber of Commerce; W. Philip Shatts, executive secretary, Metropolitan Plan Association; Charles F. Spilker, executive secretary, East St. Louis Chamber of Commerce; Scott DeKins, assistant to the president, St. Louis Chamber of Commerce, Steve Maeras, Mayor of Madison, Ill., and Robert A. Barracks, managing editor, East St. Louis *Journal*.

Chairman Johnson said that the sources of smoke in the East Side area in the order of their importance are switch engines, factories, large downtown buildings and, lastly, private residences. He urged that smoke elimination efforts be first directed against the first three sources.

Tug Strike Cuts Off New York Fuel

A ten-day strike of tugboat workers that paralyzed shipping in New York Harbor and brought about an acute fuel shortage culminated Feb. 12 in practically a complete shutdown of the normal business life of the city for 18 hours when Mayor O'Dwyer ordered the closing of theaters, bars and all businesses except those declared esssential. Controls also were tightened on coal and heavy and light fuel oil.

The Mayor lifted the ban on amusement places the same evening and the strike ended Feb. 13, pending submission of the points at issue to arbitration. By Feb. 17 a stream of oil was flowing into the city in sufficient quantity to make possible the lifting of all controls on both heavy and light oil. The coal situation, however, remained critical and coal rationing continued.

Coal from the Lumaghi mine, Collinsville, Ill., is to be tested by the Institute of Gas Technology, Chicago, to determine whether it can be processed to meet standards of anti-smoke ordinances such as the one in St. Louis. The tests have been authorized by the Illinois Coal Products Commission, which allowed $3,500 of State funds for experiments designed to produce smokeless fuel from low-grade Illinois coal. The commission has elected Joe Marchesi, of LaSalle, as chairman, vice Senator Rice Miller, Hillsboro, who resigned.

Mayor Ralph W. O'Neill of Youngstown, Ohio, has named a 14-member committee to study and recommend means of eliminating smoke.

Charles H. Hagedon has been chosen president of the newly organized Indianapolis smoke control board. E. S. Pearce, chosen vice president, also will serve on a committee with Harry Ice and Charles Bowman to select a city combustion engineer. Charles E. Bacon, city Building Commissioner, has been acting combustion engineer.

Western Pennsylvania Coal Operators' Association is the latest to join the Coal Producers Committee for Smoke Abatement, which has its headquarters in the Transportation Building, Cincinnati, it was revealed Feb. 8.

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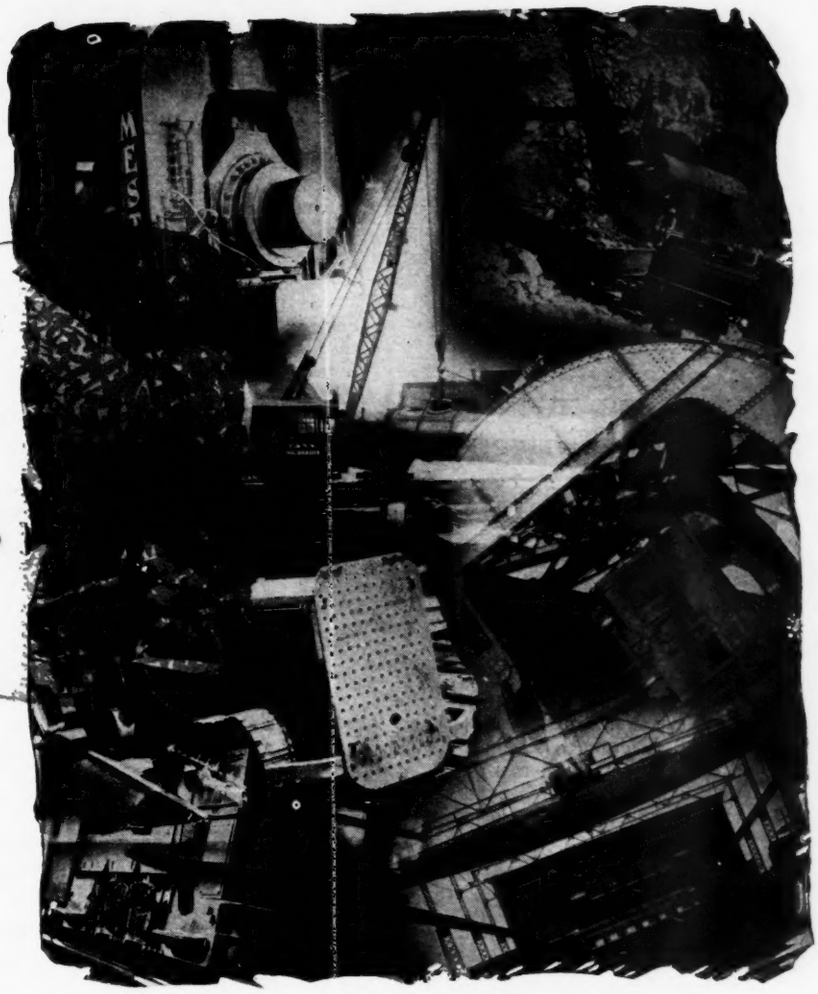
Circuit Breakers Discussed at Bluefield

Safety to personnel and adequate protection for circuits and motors as the principal advantages of arc-supressing draw-out type air circuit breakers for three-phase a.c. power of 600 volts and less were cited by F. R. Rives, switchgear specialist, General Electric Co., Philiadelphia, speaking Feb. 23 before a meeting of the Pocahontas Electrical and Mechanical Institute at Bluefield, W. Va. He called particular attention to the fact that selection of an interrupting device between a power source and a circuit calls for consideration of the short-circuit current, which the source may deliver to a fault. A good rule for feeds from transformers of the usual 5-percent impedance is to select an interrupting device that is safe for the value obtained by multiplying by 20 the rated full-load line current from the bank.

Fuses are adequate up to around 10,000 amp., Mr. Rives stated, but the inclosed knife switch used in connection with them is likely to cause personal injury if opened under conditions of heavy fault. As an example, when an operator closes a switch to start a motor, and the motor is locked because of some mechanical difficulty, opening the knife "safety switch" will tend to blow its cover off in his face. An air current breaker with dual-magnetic or thermal-magnetic trips replaces both fuse and switch, and in the larger sizes is cheaper over a period of time than a fused switch with several fuse renewals.

Mr. Rives also emphasized the danger of using oil circuit breakers, primarily high-voltage devices, on the lower voltages such as 440, as insufficient current-interrupting capacity may cause them to blow up. Air

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circuit breakers are preferable in all cases for circuits of 600 volts or less.

This meeting of the institute was sponsored by the Bluefield Supply Co. W. L. Osborne, general manager of the Algoma Coal & Coke Co. and president of the institute, presided. O. G. Crow, chairman of the program committee, reported on the plans for sponsors and programs for monthly meetings up to and including August, when the Industrial Exposition will be held at Bluefield.

•

Safety Council Plans Mine-Safety Drive

A plan to establish State and district organizations in each coal-producing State to plan and launch an intensive safety drive in all coal-producing areas has been proposed by the coal-mining section of the National Safety Council. Sponsored and aided by the Council, the State and district organizations would be composed of equal representation from operators, miners, State departments of mines and the U. S. Bureau of Mines. The training and experience of these groups also would be used to formulate sane, acceptable standards governing safety in coal mines.

"The coal-mining industry has the knowledge and the resources to stop many more accidents than are being stopped today," said Edgar C. Weichel, general chairman of the Council's coal-mining section and assistant general manager of the Hudson Coal Co., Scranton, Pa. "The time is ripe for an agreement by all parties concerned on exactly where and how this knowledge and their resources can best be applied, both for the greater operating efficiency of the country's coal mines and for the protection of the men who work in them.

"We recognize that safety is management's job," Mr. Weichel continued. "We also recognize that this job cannot be successful without the cooperation of organized labor, the U. S. Bureau of Mines and the State departments of mines. Therefore we propose to bring together all these forces and combine their resources against the oldest enemy of both management and labor."

•

Names Nucleus Staff For Fuel Laboratory

Appointment of a nucleus staff for the new Bureau of Mines synthetic liquid fuels laboratory on the campus of the University of West Virginia, Morgantown, has been reported by Dr. R. R. Sayers, Bureau director.

Dr. L. D. Schmidt, a chemist with broad experience in private industry and in the Bureau's fuel laboratories at Pittsburgh, Pa., has been appointed supervising engineer of the new laboratory, which ultimately will have a staff of some 20 persons, Dr. Sayers said. Dr. Schmidt also will serve as chief of one of the laboratory's three sections, that on briquetting and coking.

G. R. Strimbeck, former superintendent of the coke and gas division of the Morgantown Ordnance Works, has been named chief of the gas-making processes section. He was employed as coke and gas-production superintendent by the Consumers Power Co. at Flint, Mich., before accepting the position with E. I. du Pont de Nemours & Co., Inc., at the Morgantown Ordnance Works in 1941.

Other appointees are:

J. L. Elder, chemical engineer, who for several years was with the West Virginia Pulp & Paper Co. at Tyrone, Pa., and Mechanicville, N. Y., before joining the U. S. Bureau of Mines in 1935 at Pittsburgh, Pa.

A. E. Sands, chemical engineer, a reserve officer in the Army since 1942 and recently in charge of the Chemical Warfare Service's pilot plants at Frederick, Md. He was employed by several utilities and left a post as research chemist with Koppers Co. at Kearny, N. J., to enter the Army.

H. G. Graham, mining engineer, who worked for several coal firms before entering the Bureau in 1943. He is well versed in coal-preparation techniques.

M. W. Wilson, chemist; F. J. Breneborg, scientific aide; Ruby B. Baker, administrative assistant, and Ruth F. Lawrence, purchasing agent.

•

Vote for U.M.W.

Production and maintenance employees of the B. F. Goodrich Co., Dover Mines Division, have voted for representation by the United Mine Workers of America. Of the 38 eligible employees at the mine, which is at Strasburg, Ohio, 27 voted for the union, four against, and seven did not vote, according to the Cleveland office of the National Labor Relations Board.

•

Mine Fatality Rate Develops Upturn

Accidents at coal mines of the United States caused the deaths of 77 bituminous and 9 anthracite miners in December last, according to reports furnished the U. S. Bureau of Mines by State mine inspectors.

With a production of 47,100,000 net tons, the accident death rate among bituminous miners in December last was 1.63 per million tons, compared with 1.18 in the preceding month and 1.80 in December, 1944.

The anthracite fatality rate from accidents in December last was 2.27, based on an output of 3,972,000 tons, against 1.99 in the preceding month and 2.88 in the twelfth month of the previous year.

For the two industries combined, the accident fatality rate in December last was 1.68, compared with 1.25 in the preceding month and 1.89 in December, 1944.

Fatalities during December, by causes and states, as well as comparable rates for the twelve months of 1944 and 1945, were as follows:

U. S. COAL-MINE FATALITIES IN DECEMBER, 1945, BY CAUSES AND STATES

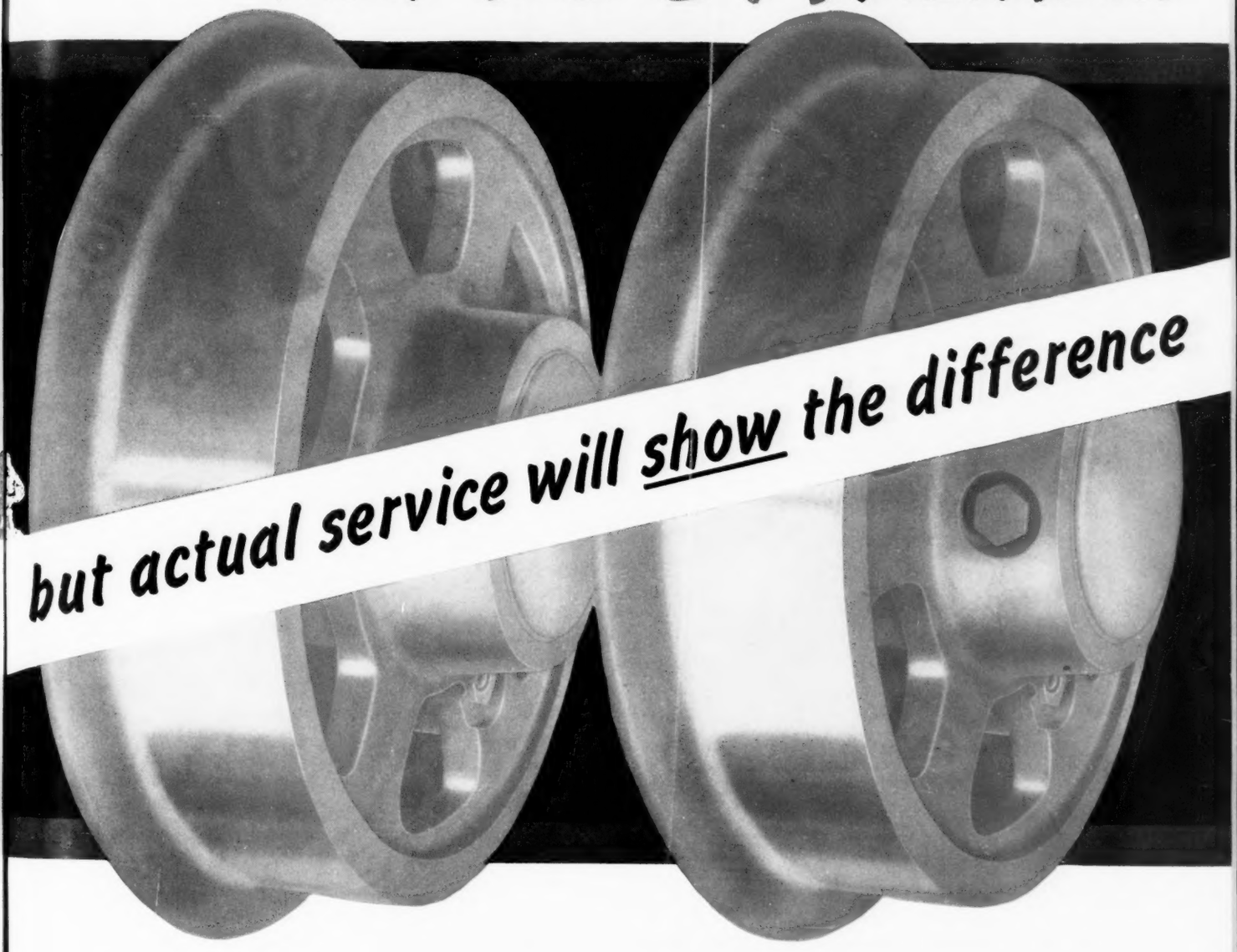
State	Underground											
	Falls of Roof	Falls of Face	Haulage	Gas or Dust Explosions	Electricity	Machinery	Mine Fires	Other Causes	Total Underground	Shaft	Surface	Grand Total
Alabama	1	..	1	..	..	..	..	..	2	..	..	2
Colorado	..	..	..	..	1	..	..	..	1	..	..	1
Illinois	1	1	3	..	..	..	1	..	6	..	..	6
Indiana	..	1	1	..	..	..	..	..	2	..	..	2
Kentucky	9	..	1	24	..	..	..	..	34	..	1	35
Montana	..	..	1	..	..	..	..	..	1	..	..	1
Ohio	1	..	..	..	..	..	..	..	1	..	..	1
Penna. (bit.)	4	..	1	..	..	..	..	1	6	..	..	6
Tennessee	2	..	..	..	..	..	..	..	2	..	..	2
Utah	..	..	1	..	..	..	..	..	1	..	..	1
Virginia	1	..	1	..	..	..	..	..	2	..	..	2
West Virginia	7	1	7	..	..	1	..	..	16	..	..	16
Wyoming	2	..	..	..	..	..	..	..	2	..	..	2
Total bituminous	28	3	17	24	1	1	1	1	76	..	1	77
Penna. (anth.)	4	..	1	..	..	..	..	1	6	2	1	9
Grand total	32	3	18	24	1	1	1	2	82	2	2	86

DEATHS AND FATALITY RATES AT U. S. COAL MINES, BY CAUSES OF ACCIDENTS*
January-December, 1944 and 1945

Cause	Bituminous				Anthracite				Total			
	Number Killed		Killed per Million Tons		Number Killed		Killed per Million Tons		Number Killed		Killed per Million Tons	
	1944	1945	1944	1945	1944	1945	1944	1945	1944	1945	1944	1945
Underground:												
Falls of roof and face	590	441	0.952	0.766	81	71	1.272	1.300	671	512	0.982	0.812
Haulage	236	199	.381	.346	24	21	.376	.384	260	220	.380	.349
Gas or dust explosions:												
Local	11	10	.018	.017	3	5	.047	.092	14	15	.020	.024
Major	22	63	.036	.109	...	...	...	...	22	63	.032	.100
Explosives	17	24	.027	.042	17	9	.267	.165	34	33	.050	.052
Electricity	35	20	.056	.035	3	2	.047	.037	38	22	.056	.035
Machinery	40	36	.065	.062	...	2	....	.037	40	38	.059	.060
Shaft	5	10	.008	.017	6	3	.094	.055	11	13	.016	.020
Miscellaneous	95	16	.153	.028	17	11	.267	.201	112	27	.164	.043
Stripping or open-cut	30	23	.048	.040	8	2	.126	.037	38	25	.056	.040
Surface	53	55	.086	.095	13	11	.204	.201	66	66	.096	.105
Total	1,134	897	1.830	1.557	172	137	2.700	2.509	1,306	1,034	1.911	1.640

* All figures subject to revision.

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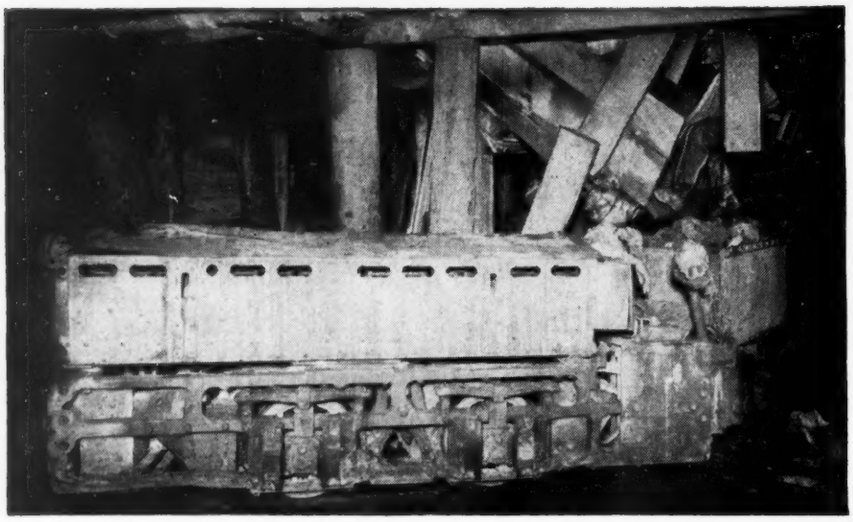
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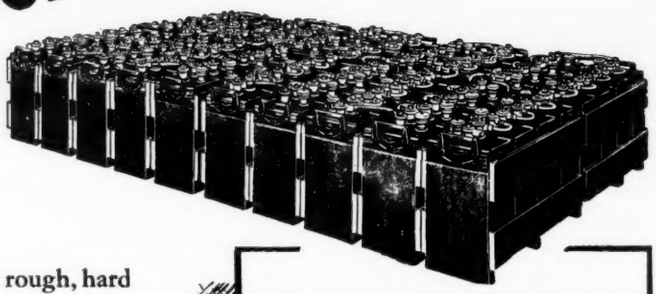
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- They are **foolproof electrically;** are not injured by short circuiting, reverse charging or similar accidents; are free from self-deteriorating reactions.
- They can be **charged rapidly;** do not require critical adjustment of charge rates; can be charged directly from mine d-c supply.
- They **withstand temperature extremes;** are free from freezing hazard; are easily ventilated for rapid cooling.
- They can **stand idle indefinitely** without injury, without attention, and without expense.
- They are **simple and easy to maintain.**

Edison
ALKALINE BATTERIES



35 places cut between resharpenings through coal having clay veins—that's the average performance of Kennametal Bits in just one Pennsylvania coal mine. Furthermore, in nearby areas, where the face is clean, Kennametal Bits are cutting up to 250 places between resharpenings!

Before Kennametal Bits were used, operations in the mine had been seriously delayed because the previously used bits could cut, on the average, only one place, and then would have to be removed from the chain.

Why do Kennametal Bits make cutting-in operations practicable where previously the cost was prohibitive? Why do they retain their edge, and cut far more footage?

Because the cutting edge is Kennametal—the tough, durable tool material that is exceptionally hard (75 Rockwell C compared to 66 for hardest tool steels).

What do Kennametal Bits cost?

Their first cost is higher than that of other bits, but their ultimate cost is insignificant, taking into consideration the economies effected through their use.

Want to increase the productivity of your mining machines, and their crews?

Test Kennametal Bits under your operating conditions —and compare results. A note from you brings catalog particulars and prices, or our mining engineer—whichever you say.

CHAINS FOR WHICH KENNAMETAL UNDERCUTTER BITS ARE DESIGNED

U1	U2	U3	U4
Short or Longwall Machines	Number 50, 52, 54 Chains	Mtd. Track or Rubber-Tired Gage	Mtd. Track or Rubber-Tired Gage
Cincinnati	.....	Cincinnati	Cincinnati
Goodman	Goodman	Goodman	Goodman
Jeffrey	.....	Jeffrey	Jeffrey
Prox	.....	Prox	Prox
Sullivan	.....	Sullivan	Sullivan
Tracy	.....	Tracy	Tracy

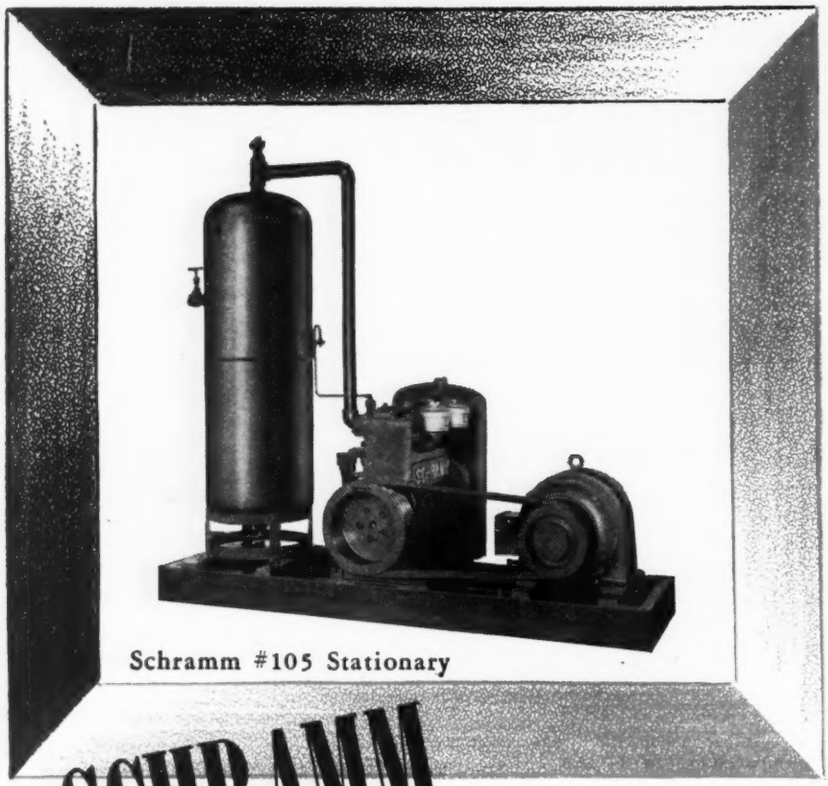
Also Available

Six sizes of two-way Kennametal-tipped drill bits—1⅜", 1⅝", 1¾", 2¼", 2½", and 3"—to increase production rates and reduce costs of mechanical drilling operations. Solid-center, double-spiral augers that minimize whip, and make fullest use of the advantages inherent in Kennametal-tipped Drills, are made by us for use with all six sizes of bits.

KENNAMETAL
SUPERIOR CEMENTED CARBIDES
TRADE MARK REG. U. S. PAT. OFF.
KENNAMETAL Inc., LATROBE, PA.

IN AIR COMPRESSORS . . . THERE ARE

MASTERPIECES *too!*



Schramm #105 Stationary

SCHRAMM

The superior features of Schramm Air Compressors put them in the class of a "masterpiece"! The reasons for this "extra" value in Schramm Compressors are: (1) 100% watercooled; (2) Forced Feed Lubrication; (3) Mechanical intake valve; (4) Compact, lightweight!

All features that are designed for heavy duty, continuous service, with minimum attention! Schramm enables you to do your compressed air jobs quickly—easily—economically! Start your compressor planning by writing today for detailed data on Schramm Compressors. Study the details of construction and you will see why Schramms are masterpieces in Compressed Air.

SCHRAMM INC.

THE COMPRESSOR PEOPLE

WEST CHESTER

PENNSYLVANIA

MEETINGS

- **Midwest Power Conference: Under sponsorship of Illinois Institute of Technology, April 3-5, Palmer House, Chicago.**
- **Canadian Institute of Mining and Metallurgy: annual meeting, April 9, 10 and 11, Montreal, Quebec, Canada.**
- **Virginia Coal Operators' Association: annual meeting, April 20, Norton, Va.**
- **American Mining Congress: annual coal convention, April 29 and 30, Netherland Plaza Hotel, Cincinnati.**
- **Drumheller Coal Operators' Association: annual meeting, tentatively, May 15, Drumheller, Alta., Can.**
- **Stoker Manufacturers' Association: annual meeting, June 3 and 4, Broadmoor Hotel, Colorado Springs, Colo.**
- **Mine Inspectors' Institute of America: 26th annual convention, June 3-5, Sterling Hotel, Wilkes-Barre, Pa.**
- **American Coal Sales Association: annual convention, June 6-8, Homestead Hotel, Hot Springs, Va.**
- **American Retail Coal Association: annual convention, June 11 and 12, Morrison Hotel, Chicago.**
- **American By-Product Coke Institute: annual meeting, June 17 and 18, Seaview Country Club, Absecon, N. J.**

Start Probe Of Kentucky Mine Blast

United Mine Workers officials attacked various conditions involving Kentucky mines at the opening session, Feb. 4 in Frankfort, Ky., of the House committee investigating the Straight Creek Coal Co. mine explosion, Dec. 26, near Pineville, that took the lives of 24. Previously the committee heard five of the seven survivors tell of their experiences following the blast.

The union representatives charged:

1. That of 144 mines in Kentucky checked by federal inspectors 142 were found to have insufficient ventilation.

2. That the eight State mine inspectors in 1944, the last year for which figures are complete, made 720 inspections among the State's 1,574 mines, whereas the law provides that each should be inspected four times annually, or a total of 6,296 inspections.

3. That Kentucky's annual appropriation of $40,000 for its Bureau of Mines and Mining is less than one-eighth of the $382,000 spent annually on mine safety by the State of Illinois, which is comparable to Kentucky in annual coal production.

4. That miners at the Straight Creek mine were told by the management to sign a "compensation book" but that actually the mine was not protected under the Workmen's Compensation Act.

5. That a management representative asked the miners' union secretary at Straight Creek not to use the State mine inspector's warning that the mine was so hazardous as to cause a work stoppage.

6. That the mine was gassy, full of combustible coal dust, insufficiently ventilated—the three causes of a "roaring hell fire underground," in the words of Sam Caddy, president of District 30, U.M.W.

7. That the failure of the management to reopen a slate-clogged second escapeway for the mine constituted "criminal negligence," according to Caddy.

8. That the miners in the Straight Creek mine followed the dangerous practice of tamping explosives charges with coal dust because the management supplied clay for the purpose "only before and immediately after State mine inspection."

Charging that the policies pursued in the State Department of Mines and Minerals since its creation many years ago have been formed exclusively and administered by the coal operators of the State, Caddy declared Jan. 28 that the agency should be restored to the people and that the inspection laws should be rigidly enforced to the letter and in spirit.

Caddy proposed three remedies by the Legislature:

1. Compulsory workmen's compensation.
2. Requirement that mine operators deliver into the mines timber to be used for safety purposes.
3. A minimum appropriation of $300,000 a year to enable the State Department of Mines and Minerals to function properly.

At the same time, Caddy said a resolution charging the department with failure to enforce mining laws and asking a searching investigation of the department would be introduced in the Legislature Jan. 29.

Terming working conditions in the Holt No. 3 mine of the Bevier-Lamb Mining Co., near Central City, Ky., hazardous, District Mine Inspectors A. O. Demoss and Edwin McGaw ordered the mine closed Feb. 4. The mine employs 140 men. This was the fourth operation ordered closed by inspectors in western Kentucky in recent weeks for similar reasons. The others were Mine No. 9 of the Pacific Coal Co., near Central City, employing 130 men; Highland Creek mine, Union Coal Co., employing 92 men, and the Henry Parish truck mine, em-

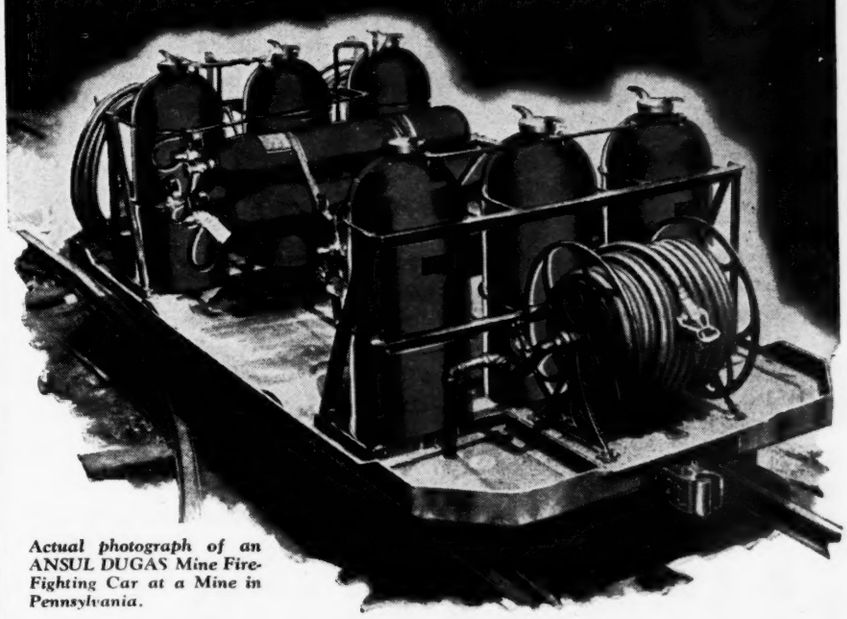
EQUIPMENT APPROVALS

Joy Mfg. Co.—Type 32D13P shuttle car (storage-battery operated); three 5-hp. motors; 90 volts, d.c.; Approval 547; Jan. 3.

Sullivan Mchy. Co.—Type CD16 rubber-tired drilling machine; either single or dual drills; three motors: 5. 3 and 1½ hp.; 230 volts, d.c. (the dual-drill model has an additional 3-hp. motor); Approval 548; Jan. 8.

AN ANSUL PRODUCT
duGas
THE MASTER OF FLAME

MINE FIRE-FIGHTING CAR



Actual photograph of an ANSUL DUGAS Mine Fire-Fighting Car at a Mine in Pennsylvania.

STOP FIRE FASTER
WITH DUGAS DRY CHEMICAL

ANSUL presents the first completely equipped Mine Fire-Fighting Car to quickly stop mine fires. An ANSUL Car made a run four miles into a mine in Pennsylvania to fight a fire which had a 35-minute start towards becoming a disastrous mine inferno. The fire was quickly extinguished by use of only one-half the dry chemical charge.

Completely self-contained, the ANSUL DUGAS Mine Fire-Fighting Car can be rushed to any part of the mine where needed. Upon striking fire, DUGAS dry chemical instantaneously releases 1,100 times its volume in flame-smothering gas that chokes off fire in seconds; and the non-toxic gas is released only in the flame area. DUGAS dry chemical is non-corrosive, non-abrasive and will not conduct electricity.

SPECIFICATIONS

Mounted on a standard mine car chassis. Equipped with two, interconnected, 300 lb. tanks of DUGAS Dry Chemical with 100 ft. of hose and one 300 lb. tank of dry chemical with a 50 ft. hose. Three nitrogen cylinders provide pressure. 100 gal. of water may be used through 100 ft. of hose equipped with a combination nozzle to provide either straight stream or spray. Pressure for expelling the water is obtained from an additional nitrogen cylinder.

The dry chemical extinguishing equipment on this car is a modification of DUGAS Large Wheeled Extinguishers which are listed and approved by Underwriters' Laboratories and Factory Mutual Laboratories.

SEND FOR BULLETIN No. 821

Install DUGAS Extinguishers at These Hazard Spots

- Maintenance and Repair Shops above and below ground.
- Electrical Equipment in Tipple, Cable Room, Haulage Ways.

ANSUL CHEMICAL COMPANY, MARINETTE, WISCONSIN
FIRE EXTINGUISHER DIVISION

40% MORE HOLES PER DAY



Actual operating records of the many machines in use prove that statement. The hydraulic feed plus fingertip control plus individual operating jacks make the job of horizontal drilling fast and sure even through the toughest formations. Compact, heavy and rugged, the *McCarthy* handles augers 4" to 9" Diameter—and drills horizontally 150 ft. Easily moved from job to job. Designed by a Strip Mine Driller who knows what operators want in drilling machines.

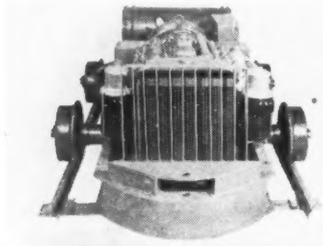
SEE THE McCARTHY BEFORE YOU BUY

In writing, be specific as to what you are drilling, depth, etc., so we can give you factual data.

PHONE — WIRE — WRITE

SALEM TOOL CO. SALEM, OHIO

Drilling and earth boring specialists. Manufacture all types of augers from 1¼" to 8" Dia. and distribute complete line of mining tools and supplies.



FRONT VIEW OF COMPRESSOR

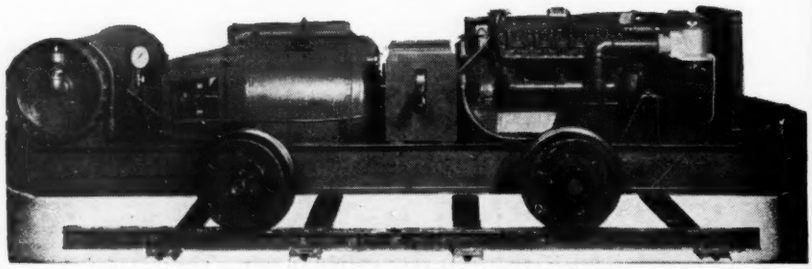
ACME "LOWBOY" Mine Car COMPRESSOR

Here's the last word in mine car compressors—light in weight—low in height—compact—mobile—and delivers 92 cu. ft. of air per minute at 100 lbs. pressure.

It is designed specifically for mine service and is adaptable to both high and low seam operation. It is particularly good in mechanized mines.

The Acme "Lowboy" operates on either 230 or 500 DC current and is equipped with a 25 H.P. motor. The compressor unit is an adaptation of the Schramm Fordair which has been so successful in many construction fields.

For complete information on this modern, efficient mine car compressor giving details of construction and complete specifications write for Bulletin No. 3920.



ACME COMPRESSOR CO.
Williamson, West Virginia

ploying eight. A fifth mine, No. 7 of the Ball Creek Coal Co., near Hazard, was ordered closed Feb. 8 by District Mine Inspectors Carl Blackwell and U. B. Bryant. It employs 70 men.

Chief Mine Inspector Harry Thomas asked Feb. 7 for a $315,200 outlay in the next fiscal year to improve service, and a State Representative announced his advocacy of a coal production tax of half a cent a ton to provide funds. The State's mine inspection service, criticized by union officials as the nation's poorest, while the State ranks fourth in production among coal-producing states, now operates on a $40,000 annual appropriation. Thomas' recommendations for improving inspection and enforcement of stricter mining laws were submitted at a special House investigation of mine safety conditions in Kentucky.

Representative John Y. Brown (D., Lexington), committee vice chairman, whose resolution for the investigation won House approval, introduced in the House Feb. 8 a bill providing for a 1c.-a-ton coal production tax to provide funds for improving mine safety conditions and research in use of coal. He estimated the tax would yield $720,000 a year. This would leave more than $400,000 for research work, he added, after meeting the State Mining Department's request for $315,200 outlay during the next fiscal year.

Brown cited work being carried on in coal research at the University of Kentucky, one project being to make gasoline from certain types of coal otherwise of little value. Meanwhile, a six-man committee to study and recommend improvements in State mining conditions was appointed by Governor Simeon Willis.

Miners' representatives chosen for the committee include Sam Caddy, Lexington; Ed Morgan, Madisonville, and Abe Vales, Middlesboro, presidents of Districts 30, 23 and 19, respectively, United Mine Workers. Operators' representatives named L. P. Johnson, Crummies; Tom W. English, Ashland, and Paul R. Wickliffe, Greenville.

Fines totaling $8,000 were demanded in petitions filed Feb. 11 in Circuit Court at Frankfort against the Straight Creek company and its officers. The penal action, brought by Commonwealth's Attorney James P. Hanrahan and County Attorney William A. Young, charged the concern was an Alabama corporation and had not complied with Kentucky law regulating operations in the latter State of non-resident corporations.

One petition declared the company had failed to file with the Kentucky Secretary of State a copy of its articles of incorporation and an annual statement showing it still was operating in the State. The other petition charged failure formally to notify Secretary O'Connell of the company's place of business in Kentucky and of the name of its process agent—the individual acting as its legal agent.

It was charged Feb. 18 by U.M.W. officials that the Straight Creek mine was improperly sealed when rescue efforts were abandoned. Sam Caddy, District 30 president, said a U. S. Bureau of Mines inspector had found the mine still contained 19 percent oxygen as compared to 21 percent under normal conditions. This indicated, he said, that fires still were raging in the mine and that it would be a long time

before the bodies of 22 men still in the mine could be recovered.

A special fact-finding House committee that investigated mining conditions in the State recommended Feb. 20 that all Kentucky coal mines be required to carry State workmen's compensation insurance regardless of the number of employees. Under present law, it is optional with employers whether they carry the insurance on their workers and with individual employees as to whether they accept it. Bills already are pending in the Legislature to make the insurance compulsory for employers of three or more persons.

The committee called for a more efficient enforcement of the mining laws through more district mine inspectors and mine weight inspectors, additional pay for them, and greater power for district inspectors in handling mines where dangerous conditions exist.

The committee suggested that firebosses be required to see that any dangerous condition in mines be eliminated before miners go into the pits for work.

Other recommendations:

1. Bring State law's definition of a gaseous mine into line with the federal law, which rates a mine gassy if a reading of 0.3 percent methane is found. State law sets a reading of 0.5 percent for dry mines and 1.25 percent for wet mines.
2. Provide for modern method of rock-dusting mines to help prevent explosions.
3. Authorize State Mining Department to take action on federal mine inspectors' recommendations where deemed fitting.
4. Provide for establishing safety rules, upon approval of chief State mine inspector, by joint action of mine operators and mine safety committees.
5. Eliminate provision that selection of checkweighmen must be approved by county judges.
6. Provide for use of permissible electric equipment in regions of the coal-mining face in gassy mines and for improving general safety features in installing and operating electrical equipment.
7. Revise statutes relating to ventilation of mines.

To assure better ventilation, the committee suggested continuous operation of fans, elimination of booster fans, establishment of breakthroughs every 60 ft., construction of stoppings and overcasts of incombustible material, confining intake air to main and secondary haulageways, preventing methane accumulations and allowing complete circulation of air.

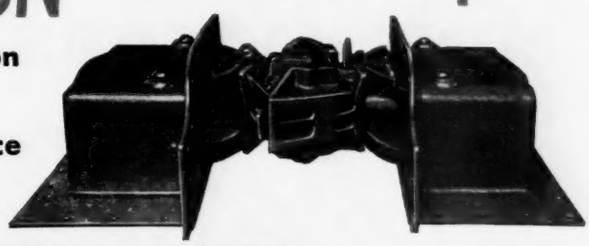
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Koppers Extends Technical Service

Eastern Gas & Fuel Associates has appointed Charles H. Sawyer as research engineer and he will supervise the Koppers Coal Division service to customers using or selling coal for heating purposes. He will coordinate this work with that of the Koppers Stoker Coal Research Laboratory, which he has directed for some time, and will continue the policy of cooperation on this work with the stoker industry. He also will

WILLISON Automatic Couplers

Increase Production
Reduce Accidents
Lower Maintenance





Improved type of spring cushioned mounting for long four wheel cars (two coupled)

For rapid and safe handling of larger capacity cars used in modern mechanized mines · · · Willison Automatic Couplers is the answer.

Safety in coupling & uncoupling
Faster shunting of cars
Higher speed haulage
Less spillage of coal
Rotary dumping in train

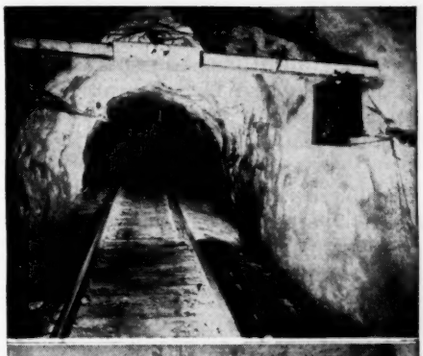
It is not necessary to go between the cars to couple or uncouple

WILLISON
Automatic Couplers

Get Circular No. 5240 for complete details.

NATIONAL MALLEABLE & STEEL CASTINGS CO.
CLEVELAND · · · · · · OHIO

CEMENT GUN COMPANY
"GUNITE" CONTRACTORS
GENERAL OFFICES—ALLENTOWN, PENNA., U.S.A.





LOWER MAINTENANCE COSTS WITH "GUNITE"

Modern coal mines have used "GUNITE" for many years for lining the sides and roofs of haulageways, slopes, entries and underground rooms with resulting big savings in maintenance costs.

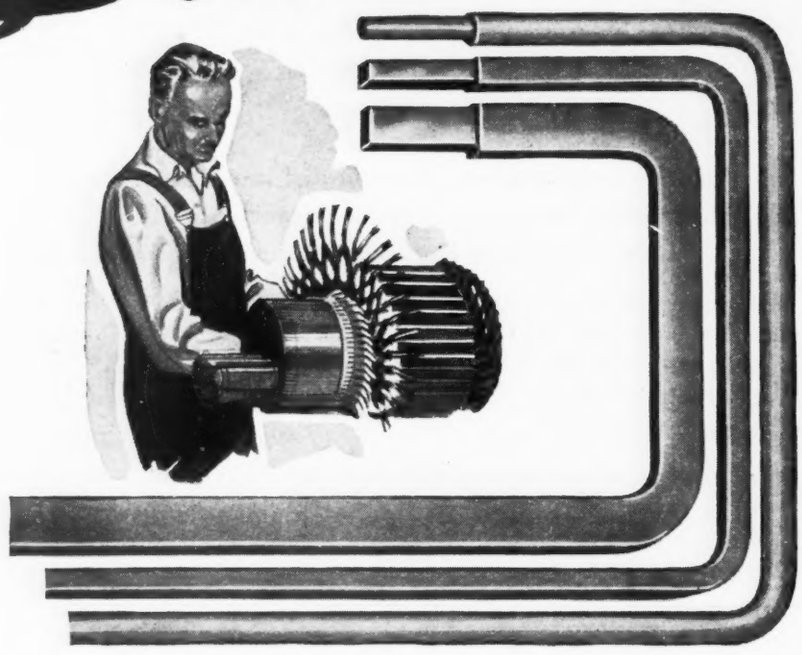
Summed up briefly, "GUNITE" offers the following:

1. Elimination of roof fall hazards, and attendant cleaning up.
2. Elimination of a great deal of timbering.
3. Additional head room and better visibility due to the light colored "GUNITE" surface.
4. Clean entries and passageways.
5. Better ventilation due to greater unobstructed area.
6. Surface of "GUNITE" retains rock dust readily.
7. Lowers mine maintenance costs.

We sell the equipment or we do the work by contract. Write today for your free copy of our new Bulletin D-2300.

MANUFACTURERS OF THE "CEMENT GUN"

REWIRE OVERWORKED MINE MOTORS WITH *Deltabeston*



The selection of the proper magnet wire is very important today because motors in mines operate at peak load with little time to cool off. As a result the overworked motors build up intense heat, wiring insulation bakes out, and mining equipment must be repaired more frequently.

Next time rewire mine motors with Deltabeston Asbestos-insulated Magnet Wires and see the difference. Motors will stay on the job longer despite overloaded conditions. Unexpected repairs will be reduced to a minimum because Deltabeston is constructed to withstand the tough operating conditions encountered in the mines. If you use ready-made coils with class B insulation, specify Deltabeston-wound coils.

Deltabeston Magnet Wire is insulated with purified felted asbestos, impregnated with a varnish compound to resist high heat, great moisture and other destructive agents. And Deltabeston is extremely flexible. Its soft copper conductors can be formed into the most intricate shapes without rupturing the insulation. Deltabeston is available in round, square and rectangular shapes in a complete range of sizes.

Do you have a rewiring job that requires a superior magnet wire? You can obtain additional information by writing to Section Y-361-10, Appliance and Merchandise Dept., General Electric Company, Bridgeport, Conn. All Deltabeston Asbestos-, Glass- and Synthetic Wires are distributed nationally by Graybar Electric Co., G-E Supply Corp., and other G-E Merchandise Distributors.

BUY ALL THE BONDS YOU CAN—AND KEEP ALL YOU BUY

GENERAL ELECTRIC

handle research in the coke and gas industry in collaboration with general research activities of Eastern Gas & Fuel Associates. A graduate of Iowa State College and a chemical engineer, Mr. Sawyer has had considerable experience in the coke and gas industry as well as with domestic coal stokers, having been associated for a number of years with the research division of Koppers Co., Inc.

Paul J. Stein has been appointed industrial service engineer. He will specialize on the recommendation of coals for industrial and utility steam-generating purposes and will aid such coal users in obtaining best results from the coal used. He also will supervise the service offered by engineers attached to the district offices of Koppers Coal Division.

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Situation Is Grave Shinwell Warns

Speaking before labor and management representatives of all the Yorkshire collieries at a meeting Feb. 9 in London, Emmanuel Shinwell, Minister of Fuel and Power, warned that unless coal production rose, factories might begin to shut down for lack of fuel. "The time has come for very plain speaking and for grave warning," said Mr. Shinwell, adding that "it is now nothing less than the patriotic duty of every single man in the industry to speed up production."

Coal output by Britain in the third quarter of last year was 12,000,000 tons less than in the third quarter of 1941, although there were more than 8,000 more men employed in the mines. In the parliamentary debate on the coal nationalization bill the preceding week, Mr. Shinwell pledged that production would be increased under nationalization.

Linking coal with the current food situation, Mr. Shinwell said that an increase in coal exports was one certain way of getting more food. Argentina, Denmark and Eire, he said, were in a position to exchange food for more coal, while in Sweden, because of lack of coal, they were burning timber badly needed in Britain.

The Fuel Minister said he did not propose to cut the domestic coal ration but assured the group that "whatever happens I am going to solve the problem of the coal industry."

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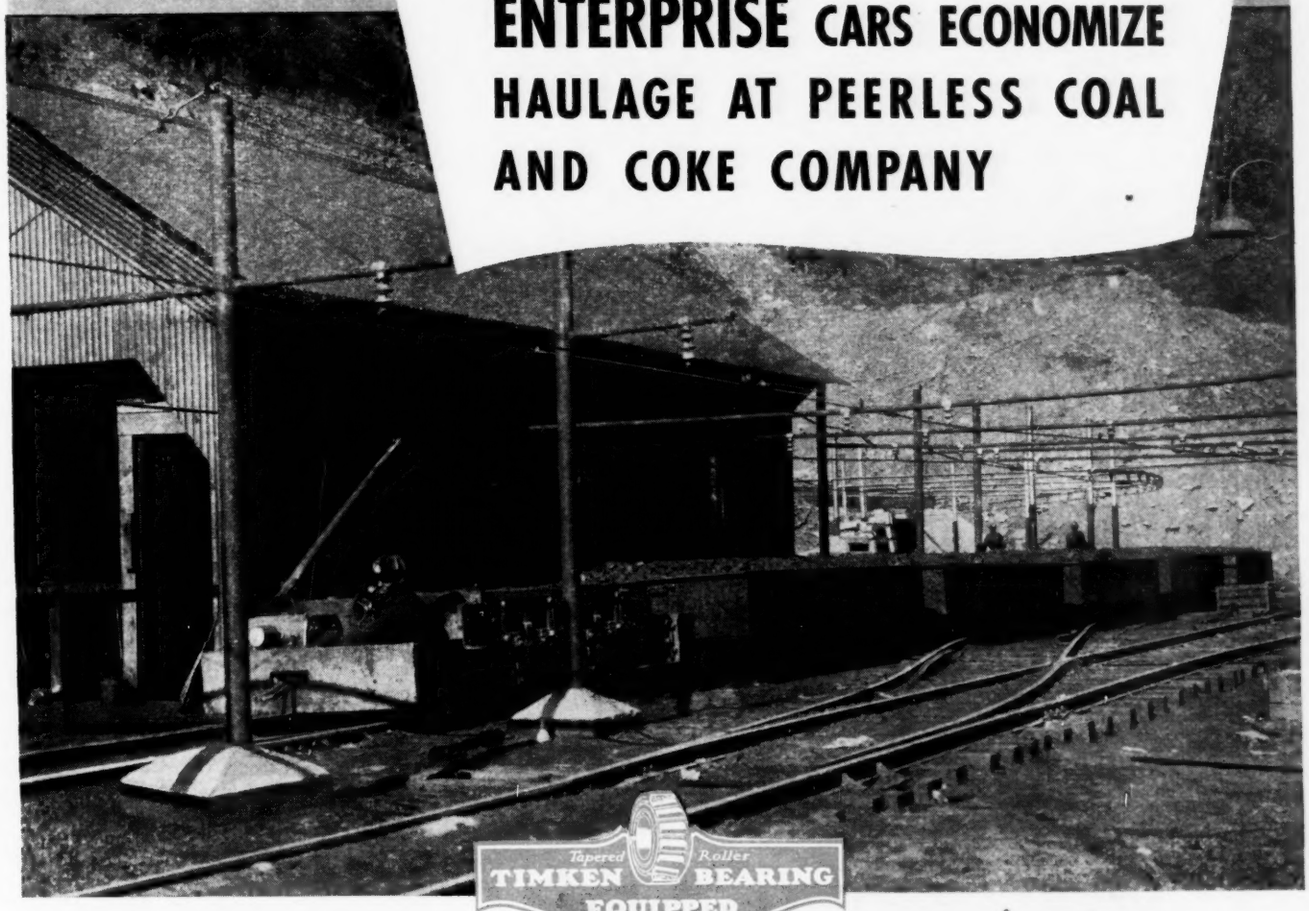
Completes 60 Years In Coal Industry

Announcing that it has passed a total production mark of 150,000,000 tons, the Bell & Zoller Coal & Mining Co., Chicago, observed in February the completion by Herbert E. Bell, chairman of the board of the company, of 60 years' service in the coal industry. He began his career in the coal industry in the late 80s with the wholesale firm of Richards, Pease & Co., Chicago, marking the beginning of the Bell & Zoller organization.

B. & Z.'s first venture in direct mine operation came in 1906, when the firm purchased the Centralia Coal Co., Centralia, Ill., which it still operates. In 1910, the company leased and reopened Zeigler No. 1

Timken Bearing Equipped—

ENTERPRISE CARS ECONOMIZE HAULAGE AT PEERLESS COAL AND COKE COMPANY



When the Peerless Coal and Coke Company, Vivian, West Virginia—for more than fifty years an active producer in the Pocahontas field—recently opened the new mine in the No. 4 Pocahontas seam shown in the photograph, they had practically no obsolete equipment problem.

From the beginning of operations, they were able to install modern coal handling equipment thought to be best suited to their requirements. Cars haul the coal from mine to dump; an underground belt conveyor system conveys the coal from dump to cleaning plant.

The cars selected for this mine are all-steel, four axle type cars measuring 16 feet long by 7 feet wide, built by Enterprise Wheel & Car Corporation, Bristol, Tenn.-Va. There are 120 in service at the present time, all equipped with Timken Tapered Roller Bearings.

The selection of Timken Bearing Equipped cars for this mine was based upon the Peerless Coal and Coke Company's long and satisfactory experience with them in the original mine in the No. 3 Pocahontas seam. The belt conveyor system, 2900 feet long, also is equipped with Timken Bearings.

More than 1,000 mine operators know it pays to operate Timken Bearing Equipped cars. Specify Timken Bearings on your next car order—and make sure the trade-mark "TIMKEN" is stamped on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS

HIGHLY PROFITABLE MAGNET OPERATION*

"Several months ago we installed one of your RECTANGULAR SUSPENDED MAGNETS ahead of one of our Launder Baum Jig combination washers and have found this magnet installation not only satisfactory in removing tramp iron from the raw coal, but it has been highly profitable in the salvaging of material which can be readily returned to the mines and reused.

"We are so enthusiastic over the performance of this magnet that we have purchased six more for delivery in the near future.

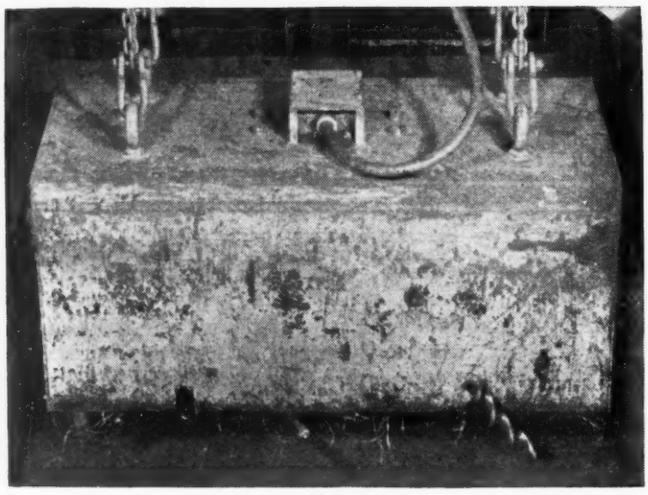
"You may be interested also to know that these magnets will replace other types magnets manufactured by other concerns."

*Name on application.

OUR Customer WROTE This AD

Letters like this confirm our belief that a well designed magnet, carefully built, results in satisfied and enthusiastic users and is its own best salesman. See picture below.

Stearns Magnets are designed in all practicable sizes and shapes to suit your application whether it be for lifting or suspended separation purposes. If you want a dependable, powerful magnet, consult Stearns Magnetic Milwaukee.

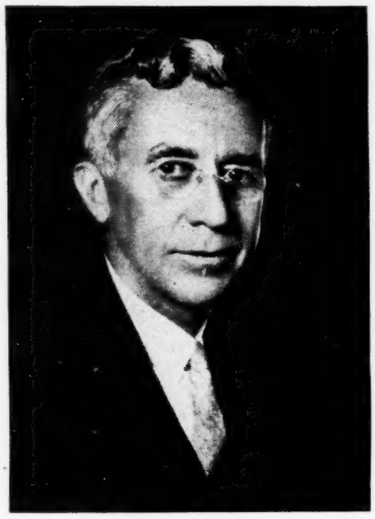


Stearns

SEPARATORS • ROLLS • DRUMS
CLUTCHES • BRAKES • SPECIAL MAGNETS

MAGNETIC MFG. CO.

661 S. 28th St., Milwaukee 4, Wis.



Herbert E. Bell

mine, in Franklin County, and eight years later began development of Zeigler No. 2 mines. In 1930, the holdings of the Crescent Coal Co., Peoria, Ill., were acquired, but these properties are no longer operated by Bell & Zoller.

There have been few changes in executive personnel since the company was organized in 1896. Mr. Bell retired from the presidency in 1937 and became chairman of the board. H. F. McDonald, who for many years was general manager, recently succeeded to the presidency.

Mr. Bell originated and controls the Cardox Corp. and also owns the 25-story Bell Building, Michigan Ave., Chicago, home of Bell & Zoller and Cardox offices.

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Coal and Coke Users' Buying Habits Studied

A survey of 37,862 New Jersey coal and coke users, believed to be an unusually comprehensive picture of how the anthracite-consuming public thinks and acts, has been released by the Fuel Merchants Association of New Jersey. While primarily designed to provide retail dealers with a basis on which to build future progress and increased public acceptance, this study is perhaps equally interesting to merchandising-minded producers seeking to gage anthracite's future competition and demand.

Confining itself to present coal or coke users by a dealer-mailed questionnaire returnable to the association, the survey analyzes the New Jersey customer thus: The average coal user (85 percent of those surveyed) has been an anthracite customer for 19 years, burning eleven tons annually; the coke customer (7.9 percent of the total) averages nine years' use, at a rate of seven tons yearly.

Of those answering, 6.8 percent, or 2,555, have stoker-fired furnaces, while 88.2 percent definitely state that their furnaces are hand-fired.

The need for additional cultivation of coal's market, and its success to date, are indicated in response to a question on fuel economy, efficiency and safety. While coal and coke carry a safe lead, ample room for

Atlas was first with these:



Need help on blasting problems?

CALL ON **ATLAS** FIRST!

No two blasting requirements are exactly alike—even on the same job. That's why the use of the right explosive, in the right amount, in the right way calls for cooperation between men who know explosives, and you, who know your operation.

More and more men are calling on Atlas *first*. That's because Atlas has led in new developments — because Atlas is interested in the development of new methods and products—because Atlas is *willing* to be of help on blasting problems.

Do you need help on some blasting problem? We will be glad to match our "know-how" on explosives with your experience and knowledge of your job. Working together is the best way to get the best results for the least expenditure of money.

ATLAS EXPLOSIVES
"Everything for Blasting"

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. • ***Offices in principal cities*** • ***Cable Address—Atpowco***

improvement is evident. Detailed answers to the question are as follows:

MOST ECONOMICAL

	Percent		Percent
Coal	66.2	Gas	3.2
Coke	6.7	Oil	9.1

MOST EFFICIENT

Coal	47.0	Gas	12.5
Coke	5.8	Oil	13.6

SAFEST

Coal	59.5	Gas	6.6
Coke	5.9	Oil	8.1

It is to be noted that in answering this question 14.8 percent had no opinion on fuel economy, 21.1 percent none on efficiency, and 19.9 percent none on safety.

From a question on plans "when coal stokers are available," future market possibilities for stokers are revealed. According to their present plans, 5.5 percent of the total surveyed expect to have a stoker, 34.6 percent are "undecided," while 42.6 percent definitely state "no." Among these 34.6 percent who are "undecided," the industry has a great opportunity to develop fully satisfied users.

The use of thermostatic controls is perhaps surprising, with 10,287, or 27.2 percent, owning such controls. If the 6.8 percent noted as having stokers are deducted from this total, there is a net of 20.4 percent who use thermostatic heat controls with hand-fired furnaces.

Further questions were aimed at determining the effectiveness of retail dealers' service, methods of dealer selection, and related subjects. A detailed analysis of the entire survey, with dealer and county breakdowns, has been made available to member dealers and other interested parties. Interestingly enough, 35,784, or 94.5 percent, definitely stated their dealers' services had been satisfactory, and 5,017, or 14 percent, took the trouble to make suggestions on improving dealer service.

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Personal Notes

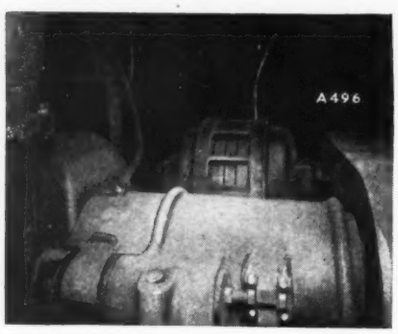
MILTON H. FIES, Birmingham (Ala.) consulting engineer, has been appointed manager of the coal operations of the Alabama Power Co. He established offices as a consulting engineer Sept. 1, 1944, when he resigned as vice president of the DeBardeleben Coal Corp., after being associated with the company for 32 years. He continued to serve the company as consultant as well as the Alabama Power Co. E. W. ROBINSON has been relieved of the responsibility of the Alabama Power Co.'s coal-mining operations at his own request. Mr. Fies also has served as mine inspector for the Republic Steel Corp. and as general superintendent of mines for the Birmingham Coal & Iron Co. (now Woodward Iron Co.).

JAMES H. PIERCE, of Pierce Management, Inc., Scranton, Pa., left for China Feb. 16 accompanied by Messrs. Koper, Eaton and Woomer, of his staff, to make plans for the development of the coal and mineral resources of that country. It is expected that the initial phase of their work will take about five months. Their headquarters will be at Peiping, in care of the National Resources Commission of China.

G. A. SHOEMAKER, operations vice presi-

Abrasive Coal Slurry Kept Pump Costs High -- *until an Amsco-Nagle was Installed*

Pumping coal fines in a semi-suspended state had been, since 1933, a costly operation at the preparation plant of a bituminous coal mine in



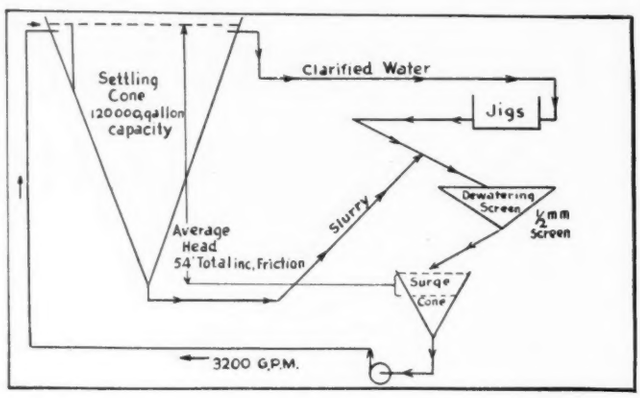
A-496. Amsco-Nagle 10" Type "T" frame 24 pump as installed at the coal mine; showing the bearing, adjusting nut and back of the casing.

Allegheny County, Pa. There is a terrific abrasive action involved in pumping these coal fines, with a solids content of 12-15%, including a considerable proportion of pyrites. Pump life was short in this plant and replacement costs were excessive.

The pump originally employed was a 10" horizontal type, with both the pump housing and its 17½" impeller made of grey cast iron, operated at 870 r.p.m. The material cost for replacement pumps and parts alone amounted to approximately $260.00 a year. The pump would stand up with satisfactory performance, although with considerable leakage through the stuffing box, for about six months, after which capacity would drop off, due to wear, to a point where a spare impeller had to be installed about two months later. After another three or four months, the case and spare impeller were worn beyond repair. These conditions prevailed for eleven years.

In August, 1944, an Amsco-Nagle 10" Type "T" frame 24 pump was installed. After initial adjustments this pump operated with complete satisfaction and has continued to do so. Normal operation is sixteen hours a day, six days a week. The most recent check shows that its capacity is still up to par. The only maintenance of consequence has been building up the suction cover about $\frac{3}{16}$" to compensate for wear, eight months after installation.

Amsco-Nagle pumps give economical service where other pumps are costly to maintain because of advanced design and water ends made of the metals best suited to withstand the specific destructive conditions encountered. Why not let us help on *your* problem!



Sketch shows water circuit for handling slurry at the Pennsylvania mine.

Elevating and Conveying Chain of Tough Manganese Steel is described in Bulletin 742-CN.

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Chicago Heights, Ill.; New Castle, Del.;

Denver, Colo.; Oakland, Calif.;

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AMERICAN MANGANESE STEEL DIVISION

CHICAGO HEIGHTS • ILLINOIS

AMERICAN Brake Shoe COMPANY

To Get AT Coal Faster...

Haul 20 Cu. Yds. of Overburden



To Get Coal OUT Faster...



Haul 60 Ton Payloads

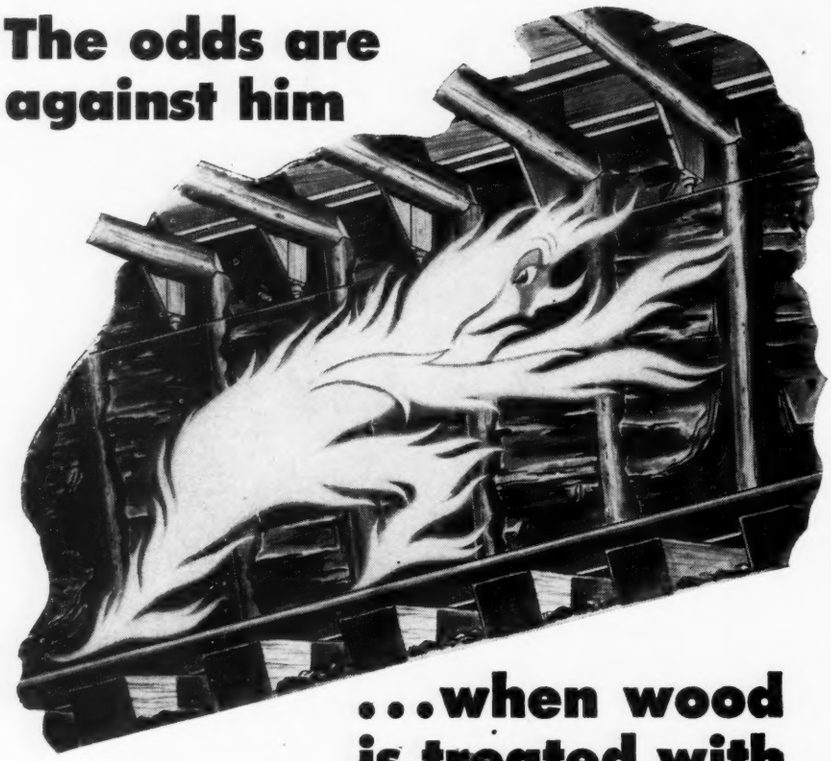
DON'T handicap your overburden removal or coal stripping with small-size trucks or trucks unable to navigate rough country. You can do BOTH jobs on a BIG scale with Walter Tractor Trucks. With their enormous traction and power, Walter Tractor Trucks easily pull fully loaded 20 Cu. Yd. Side-Dump Trailers over broken, loose ground, through deep mud and up steep grades. Hitched to one or two coal trailers, they deliver 30 to 60 ton payloads from pit to dumping point.

This performance is made possible by the unique Walter Four Point Positive Drive. Three automatic locking differentials proportion the power to the FOUR driving wheels according to the traction of each wheel at any instant. Full engine power is delivered—wheel spinning is arrested—tire grinding and road gouging are prevented. Other features of this complete strip mine hauler include suspended double reduction drive for high road clearance, more efficient power transmission; tractor type transmission for broad gear ratio selection; engine-ahead-of-wheels design for short wheelbase, better weight distribution. Write for complete description.

WALTER MOTOR TRUCK CO. 1908-17 Irving Avenue Ridgewood 27, Queens, L.I., N.Y.

WALTER TRACTOR TRUCKS

The odds are against him



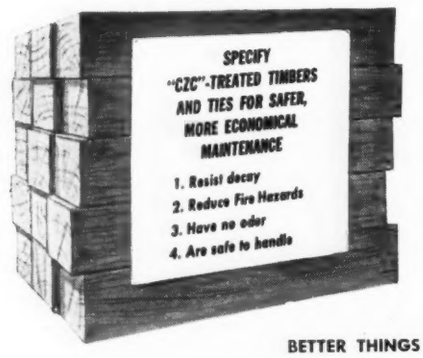
...when wood is treated with "CZC"

The spread of fire in mines is retarded when "CZC"-treated wood is used for timber and ties. But resistance to fire is only one of the advantages that "CZC"-treated wood offers.

Ties that have been treated with Du Pont Chromated Zinc Chloride will last many times longer than untreated ties. "CZC" safeguards them against fungous growths that cause destructive, weakening decay. It makes them more durable—better able to withstand continued usage.

You'll find that safety is increased and maintenance costs are lowered when "CZC"-treated wood is used. Accidents caused by weakened ties and timber or fire are reduced; many costly delays caused by replacements are eliminated.

For additional information about "CZC"—the wood preservative that gives wood longer life—write E. I. du Pont de Nemours & Co. (Inc.), Grasselli Chemicals Department, Wilmington 98, Del.



DU PONT CZC

Chromated Zinc Chloride

WOOD PRESERVATIVE

DU PONT

REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

dent of the Pennsylvania mines of the former Consolidation Coal Co., has been appointed operations vice president of the Pittsburgh Coal Co., subsidiary of the recently merged Pittsburgh Consolidation Coal Co.

Alan B. Cunningham, formerly assistant electrical engineer with the Pittsburgh Coal Co., has been promoted to electrical engineer. Graduated from Penn State in 1930, Mr. Cunningham joined the Pittsburgh company in 1934 after having been connected with the West Penn Power Co.

Lewis Barco has been discharged from Seabee service at Great Lakes, Ill., and has been appointed assistant mine manager at Solar mine of the United Electric Coal Cos., near Rushville, Ill.

Edward Slater, field representative for the Anthracite Institute, in charge of Ontario and Quebec (Canada) territory, has resigned.

William J. Jenkins, president and general manager, Consolidated Coal Co., operating in southern and central Illinois, has been elected chairman of the board of the Mutual Bank & Trust Co., St. Louis, vice Byron Moser.

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Association Activities

Operators' Association of the Williamson Field has elected for the 19th consecutive year L. E. Woods as president and Joseph J. Ardigo as secretary. Other officers renamed were C. A. Hamill, vice president, and J. D. McLaughlin, treasurer.

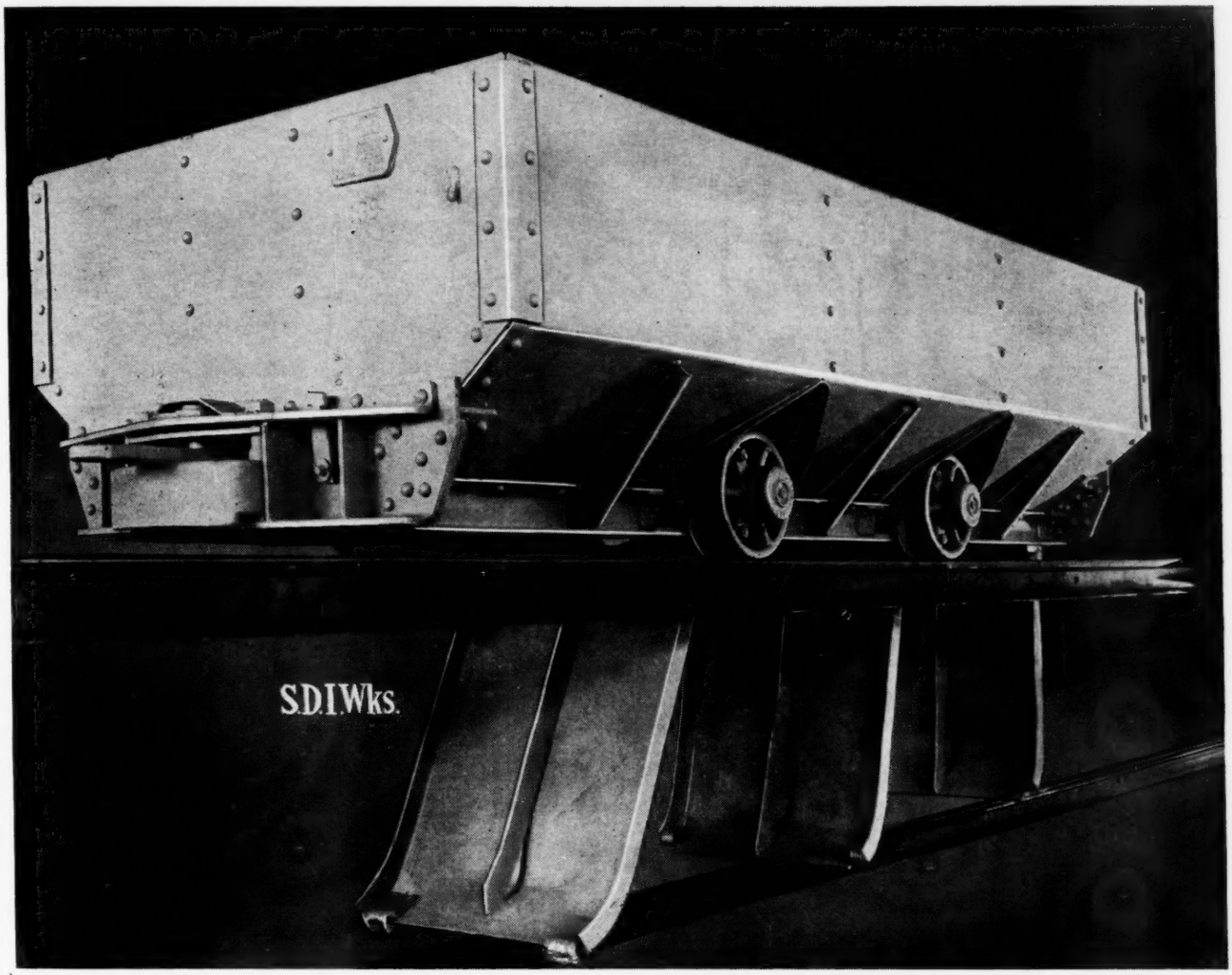
Upper Buchanan Coal Operators' Association has elected C. A. Hamill as president; J. W. Strickler, vice president, and Joseph J. Ardigo, secretary.

Alabama Fuel Association has reelected I. W. Rouzer, president, and Clyde A. Pippen, secretary-treasurer.

Illinois Society of Preparation Engineers and Chemists has elected George A. Strunck, Old Ben Coal Corp., as president; Tom L. Garwood, Chicago, Wilmington, & Franklin Coal Co., vice president; J. Lanning Dress, Binkley Coal Co., vice president; and Carl E. Campbell, Shell Oil Co., secretary-treasurer (reelected).

Illinois Coal Operators' Association elected the following officers at its annual meeting, Feb. 19: president, George F. Campbell, vice president and general manager, Old Ben Coal Corp.; treasurer, C. W. Peterson, Bell & Zoller Coal & Mining Co.; general counsel, Thurlow G. Essington; secretary, Fred S. Wilkey; scale committee—D. H. Devonald, vice president, Peabody Coal Co. (chairman); Hubert E. Howard, president Binkley Coal Co.; G. F. Campbell; H. A. Treadwell, vice president, Chicago, Wilmington & Franklin Coal Co., and William P. Young, president, Bell & Zoller Coal & Mining Co.

Big Sandy-Elkhorn Coal Mining Institute has elected as president Edgar Dale, assistant to general superintendent, Elk Horn Coal Corp., Wayland, Ky. He

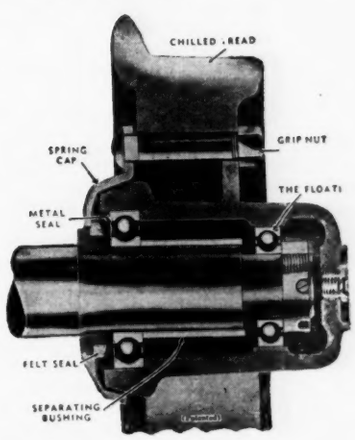


S-D 1-2-3 "Automatics" Are Sold Strictly On Their Ability To Reduce Costs

With the exception possibly, of a few rare cases, no coal mine is operating at its lowest cost of production without S-D 1-2-3 Automatic mine cars.

This is a bold statement, nevertheless it is backed by records of fact from many mines where other types of cars have been replaced with S-D 1-2-3 "Automatics".

When one mine changes over to S-D 1-2-3 "Automatics" and by so doing, increases output of loading machines over 50 percent . . . releases 18 men for other work . . . cuts lubrication of wheels to one time in 5 years because of S-D "Floater" wheels, and, which, are so easy rolling they permit your locomotive to pull up to 50 percent greater load, then it's time to investigate the car that's sold strictly on its ability to reduce costs . . . the S-D 1-2-3 "Automatic".



No other wheel matches, point for point, the advantages of the S-D "Floater" for low cost operation.

Sanford-Day Iron Works KNOXVILLE, TENNESSEE



This 10" MORRIS

CENTRIFUGAL ABRASIVES PUMP

after 9 years in a mid-western coal mine!

Four thousand gallons of "circulating water" per minute . . . with 5% solids . . . pumped against a 62-foot head for a period of 9 years! That's the proud record of this 10", Type "M" Morris Pump. Sounds impressive, but it is just typical Morris performance—the result of 81 years "know how" in coordinating design, speed and wear-resistant alloys to pump high, uniform volumes of heavy and abrasive liquids at high heads.

Pressure Balanced Impeller Increases Efficiency

Extra vanes with a larger diameter, on the suction side of the Morris impeller—an exclusive patented feature—balance the pressure inside the pump, prevents excessive circulation of gritty solids between the shell and the suction disc liner, minimizes eddy losses and leakage, and improves efficiency. This, plus Morris "Flintmetal"—a special low-chrome alloy with a Brinell hardness around 700—is responsible for the remarkable wearing qualities of the pump.

● *Write today for performance tables, specifications, requirements and other data. Find out how Morris Pumps are making remarkable records for efficiency, long wear and low cost in mines all over the country. Let our engineers recommend the sizes and types suited to the particle sizes, densities and volumes of the materials you have to handle. No charge. No obligation.*

MORRIS MACHINE WORKS
Baldwinsville, N. Y.
Sales Offices in Principal Cities

MORRIS CENTRIFUGAL PUMPS

suceeds V. D. Picklesimer, Secco. Other officers named were: vice president, M. M. McCormick, superintendent, No. 155 mine, Consolidation Coal Co., Van Lear; second vice president, Arthur Bradbury, safety engineer, Inland Steel Co., Wheelwright; third vice president, Fred Sherman, superintendent, Thealka Mine, North-East Coal Co., Thealka. A. D. Sisk was elected secretary-treasurer for the tenth time.

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New P. & R. Unit To Run Stripping

Stripping planned for the Shenandoah (Pa.) area properties of the Philadelphia & Reading Coal & Iron Co. will be operated by the Shen-Penn Production Co., a newly organized subsidiary of P. & R., according to an announcement Feb. 12 by George A. Roos, general manager. Shen-Penn, which has set up offices at Shenandoah, is proceeding with preliminary plans for the stripping operation. All necessary equipment has been ordered and is to be delivered soon. Construction will be started immediately on repair shops and other surface buildings.

It is expected that when the stripping reaches full operation it will employ at peak about 500 men, said Mr. Roos. "It is the hope of the company," he proceeded, "that the stripping will add to the economic life of the Mahanoy Division, which embraces St. Nicholas Central Breaker and Maple Hill, Knickerbocker and Mahanoy City collieries, with their several thousand workers.

"The fire that has been burning in the Shen City mine for about the last 20 years has made it physically as well as economically impossible to mine that coal through deep-mining methods. The same is true of the abandoned Indian Ridge colliery, which is directly affected by the fire at Shen City. This stripping project," he added, "will permit the company to reclaim coal that it otherwise could not mine economically. It also will give employment opportunity to several hundred men in the Shenandoah area who otherwise might not be able to find work."

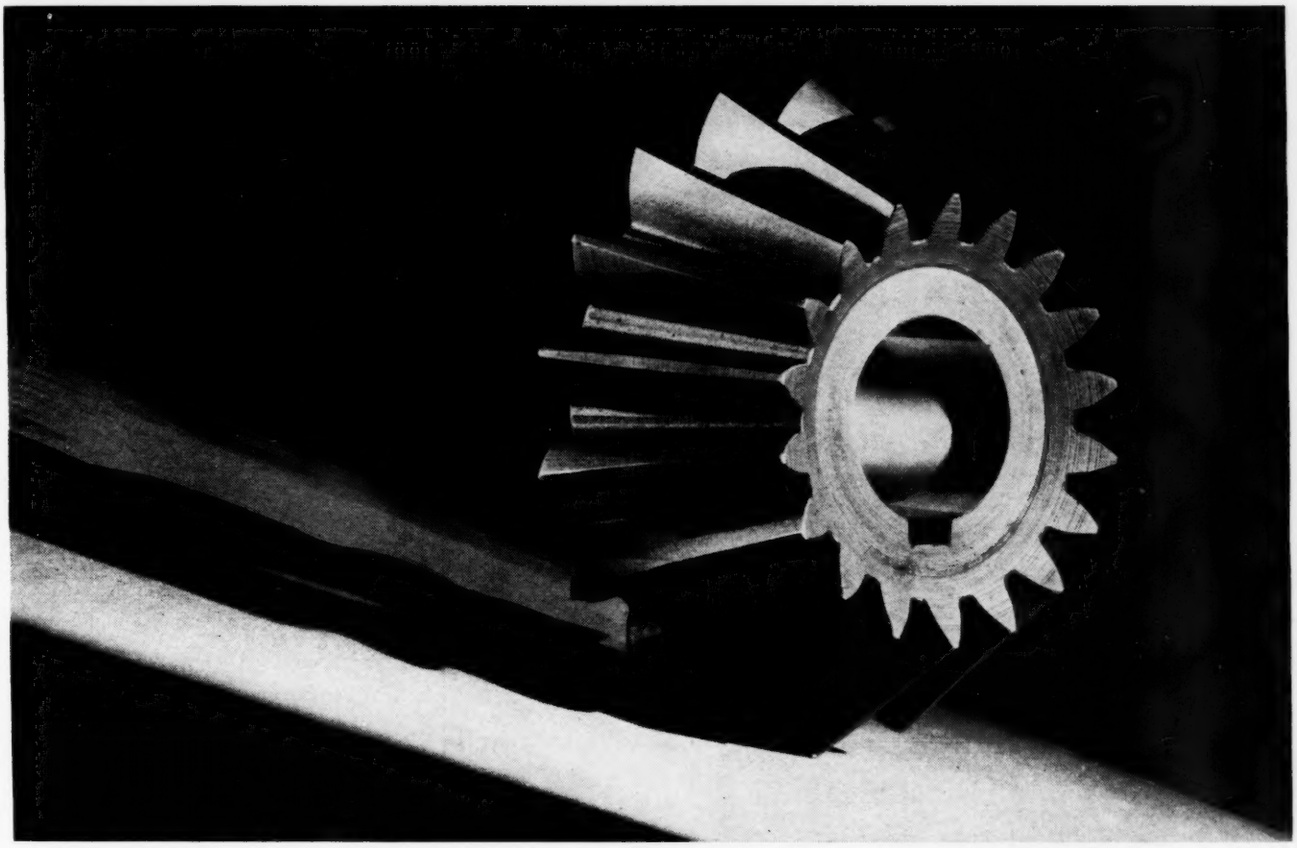
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Ickes Defines SFAW Activities

Secretary Ickes, as Solid Fuels Administrator, issued Feb. 4 the following statement:

"It is contemplated that the Solid Fuels Administration for War will discontinue completely its activities by June 30, 1946. Many of the SFAW regulations and orders now in effect will expire or be revoked March 31, 1946. After April 1, SFAW will, however, to meet emergency conditions, continue to exercise its authority to issue directions under SFAW Regulation No. 1 and to exercise limited control over the movement of solid fuels for export under SFAW Regulation No. 31.

"Contracts for the shipment of bituminous coal to the Great Lakes and contracts for the shipment of special-purpose coal for the coming fuel year, April 1, 1946, to March 31, 1947, will not have to be filed with the Solid Fuels Administration for War,

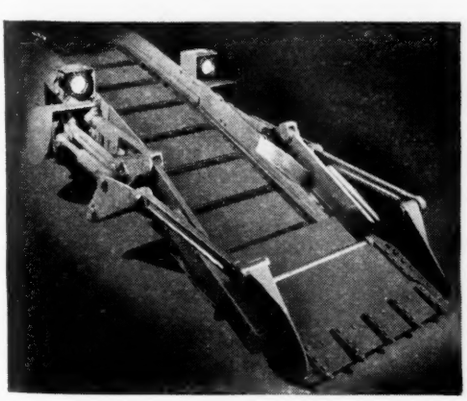


IT LOADS SEVEN TONS A MINUTE

Every original moving part, and replacement part, of the Whaley "Automat" Mechanical Loading machine is built under the supervision of our own engineers . . . in our own plant. And each of these parts is built to stand the wear demand of the rated 7 tons a minute capacity of the Whaley "Automat". Each part built for service first . . . for sales last. These are the reasons why genuine "Automat" replacement parts are always dependable, always preferred . . . the reasons why only genuine Automat parts are approved by Myers-Whaley.

Remember, the "Automat" will load—in its stride—any lump of coal that will pass through your tipple, or any lump of rock your cars, aerial tram or larry can take.

It's these all-precision-made and perfectly synchronized parts that gives the Whaley "Automat" its smooth operation . . . its stamina to produce maximum tonnage in coal and whole seam mining, slate or heavy rock loading. It's the toughness and "teamwork" of its many parts that insures uninterrupted service and low maintenance cost.



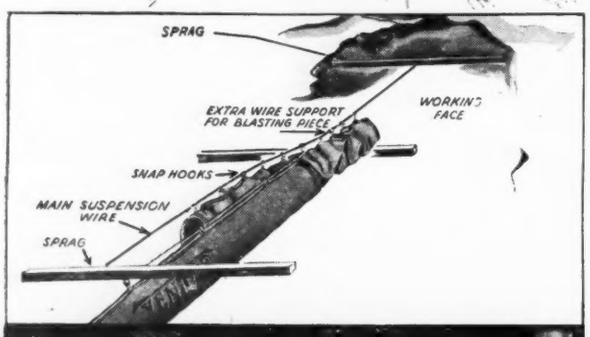
This outstanding level of production can be maintained only when you keep the "Automat" all "Automat"—through and through. Myers-Whaley Company, Knoxville 6, Tennessee.

Wm. Neill & Son, Ltd., St. Helen's Junction, Lancashire, England, are licensed for Manufacture and Sale in Great Britain and Europe.

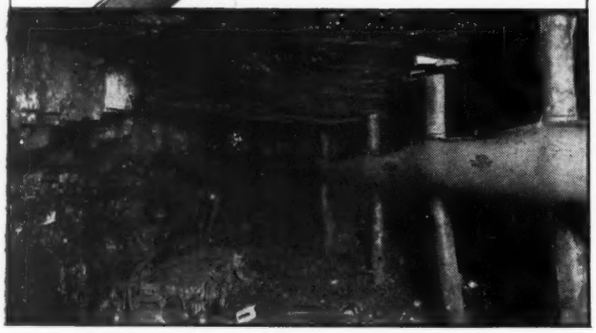
MYERS-WHALEY

Mechanical Loaders Exclusively For Over 38 Years

After Blasting Save Work-Time With "VENTUBE"*



1. Special blasting section of "Ventube" is speedily withdrawn before blasting — saves time and labor. It is quickly slid back into position after blast.



2. Fresh air sweeps face clear of dust in a few minutes—men get back to work promptly. "Ventube" and portable blower can increase efficiency and lower costs.

When a charge is shot, headings fill with fumes and dust. Temperature goes up. Men and machines must remain unprofitably idle till suitable working conditions are restored. Du Pont's flexible, rubberized ventilating duct quickly clears fumes, cuts short that idle time. Thus it speeds production, saves costs. And "Ventube" is being used by more and more operators for its many other advantages:

Low initial cost—"Ventube" costs less to install than rigid ventilating systems. One man can carry 100 feet.

Adaptable—"Ventube" bends around corners, takes up a minimum of space in openings. It doesn't get in the way of men at work. Easily extended as face advances.

Compact—Your men can easily pack and store "Ventube" for installation elsewhere. Sections are swiftly connected and disconnected with simple patented couplings.

For further details, or consultation with Du Pont Technical Service, just write E. I. du Pont de Nemours & Co. (Inc.), Fabrics Division, Fairfield, Conn.

*"**VENTUBE**" is Du Pont's registered trade mark for its flexible, synthetic rubberized ventilating duct.

"VENTUBE" HINTS FOR SAFETY AND SAVINGS

1. Blower must have adequate air capacity, permissible motor, proper ground connections, and unobstructed air intake. Avoid sharp kinks or bends in tubing.

2. If power fails, turn off the blower switch.

3. Place blower at least 15 feet upstream from the *last drift* or crosscut, *in the main airstream*, to prevent recirculation.

4. Always check the area for presence of gases before turning on the blower.



DU PONT "VENTUBE"

REDUCING COSTS THROUGH BETTER VENTILATION

DU PONT

BETTER THINGS FOR BETTER LIVING ...THROUGH CHEMISTRY

and producers, distributors and consumers of solid fuels will be free to make their own agreements without governmental restriction as to quantity or source of supply. However, no shipments may be made prior to April 1 which do not comply with existing regulations unless prior approval of such shipments is obtained from the Solid Fuels Administration for War."

•

Seek to Terminate Bootleg Mining

The Anthracite Allocation Committee of Pennsylyania has called on the State and federal governments to take action on the bootleg mining problem in the anthracite area. Stating that the death rate in bootleg mining was six times as great as in legitimate mining, Secretary D. L. Corgan said "bootleg mining should be stopped for humanitarian reasons if for no other. Absorption by unions of the bootleggers together with strict enforcement of State and federal laws should eliminate illegal mining in Pennsylvania," he added.

Governor Edward Martin declared Feb. 22 that bootleg mining has been completely eliminated as he made public a report by Richard Maize, Secretary of Mines. The report stated that the 398 free-lance mines now in operation are all obeying the safety rules of the Commonwealth. They employ 1,728 men and are producing about 950,000 tons of coal a year.

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Limit Authorization Of CC Ratings

Direction 1 to Regulation 28 has been amended, effective Feb. 28, by the Civilian Production Administration. The special authorization for assignment of CC ratings on capital equipment (other than underground coal-mining machinery) and on new construction is now limited to "producers of high-grade metallurgical and byproduct coking coal or double-screened domestic coal" in bituminous districts 1, 2, 3, 7, 8 and 13 and the Pennsylvania anthracite fields. Formerly, the special provisions applied to all coal producers in the area east of the Mississippi River.

•

P. & R. Briquet Plant Starts Output

The new briquet plant of the Reading Briquet Co. adjoining the Locust Summit (Pa.) Central Breaker of the Philadelphia & Reading Coal & Iron Co. began partial production Feb. 19. A second briquet plant now under construction by Day & Zimmerman, Inc., adjacent to the St. Nicholas Central Breaker is nearing completion and is expected to be in production some time in April.

When they reach peak production, these two plants will employ about 100 men and have a combined capacity of 2,000 tons of briquets daily. Operations of the Reading Briquet Co. will be supervised by the American Briquet Co., which has had 27 years of

THE PRESIDENT'S WAGE-PRICE POLICY WON'T WORK

THE AMERICAN public had every right to expect that the long-awaited wage and price policy would break the impasse blocking the way to the swift and orderly reconversion of industry from war to peace.

The policy announced offers little promise of such solution, and this may well constitute a national calamity.

There is only one thoroughly constructive feature of the Presidential Statement of February 14 and its implementing Executive Order. It is the first Government pronouncement since the defeat of Japan to clearly define inflation as the major danger confronting us in the period immediately ahead.

That is a correct appraisal, and one long overdue. Up to now Government spokesmen, almost invariably, have sought to carry water on both shoulders. The Administration has justified its policy of promoting wage increases as a measure necessary to forestall deflation — to keep purchasing power from falling and forcing the economy into a violent tailspin. The strict holding-of-the-line on price ceilings has been defended as necessary to prevent runaway inflation. Unfortunately, while the President now exhorts all to enlist in a crusade against inflation with a voice that is clearly Jacob's, his program for dealing with it still employs the hairy hands of Esau to promote the very danger which he is urging everyone else to combat.

The "new" policy provides for a continuation of the wage increases that have been pressured through by Government mediators, "fact-finding" boards, and direct seizures until they have been made general throughout industry upon the dimension established in recent patterns. It offers industry the single concession of prompt hearings and decisions upon claims for price advances, but the yardsticks for judging such claims are exactly those which OPA has applied in the past. Since the past procedure has led us into our present difficulties, it is hard to see how it will serve now to lead us out of them.

Past Government Policy Fostered Dissension

At the war's end, it was obvious to everyone that what was needed was the swiftest possible reconversion of industry. It should have been equally apparent that we were faced with the difficult problem of controlling tremendous inflationary pressures which would be particularly insistent until peacetime production could be mobilized at high volume. This was made almost inevitable by the huge backlog of accumulated demand, for both capital and consumer goods, and by the unprecedented volume of liquid funds at the disposal of individuals of all classes. The only circumstance that could have modified the inflationary complexion of the postwar picture was the possibility of such wholesale and prolonged dislocation and unemployment in the process of readjustment that people would have been frightened into freezing onto their savings instead of spending them.

It soon was apparent that just the opposite was taking place. The early transition was extraordinarily swift, unemployment was lower than anyone had dared hope, and civilian spending outstripped all previous records. The circumstances called for strong anti-inflationary fiscal measures, along with a firm maintenance of price and wage controls alike.

Instead of adopting such a balanced program, the Government immediately discarded all wage controls, and in addition started an active campaign for promoting large wage increases. The President, upon a number of occasions stated flatly that American industry generally could and should grant substantial pay advances without any compensating price rises. His Office of War Mobilization and Reconversion estimated that average increases were practicable to the extent of 24 per cent. Given such Governmental encouragement, it was inevitable that labor leaders should do exactly what they did—file extravagant wage demands at the beginning of the reconversion process, when accurate appraisal of production schedules and costs were least susceptible of calculation, and when the shortage of civilian goods multiplied the inflationary effect of any increase in purchasing power.

At the same time, the OPA was fighting to hold the price line in a good cause, but with singularly inept procedure. It acted, seemingly, upon the premise that it was always better to give less price relief than was needed rather than enough, that relief provided under its formula was preferably to be granted later rather than on time, and that the interests of lower-bracket income receivers should be protected by a particularly tough resistance to raising prices of cheaper goods. The latter procedure seems to have boomeranged by virtually driving many of the lower-priced lines off the market.

The sum of these wage-price procedures resulted in work-stoppages of epidemic scope. Many business concerns faced with the prospect of immediately unprofitable operation, uncertain that new wage demands would not be made with Government support as soon as volume production was established, and without assurance as to when price controls would end, refused to assume inevitable losses even when confronted with combined union and Government pressure. The fight was on.

"New" Policy Differs Little From Old

With inflation now clearly recognized as the immediate danger, it might have been expected that the new wage policy would reverse the former practise of lending active encouragement to new wage advances. But that would have brought down upon the Administration the wrath of all organized workers who had not yet been granted increases already bargained through by other groups. This was avoided by directing the National Wage Stabilization Board in effect to approve any wage increases necessary to give general advances comparable to those already made. The only brake applied on the wage side lies in a directive to the Board not to approve, as a basis

for price relief, wage advances that go beyond the established pattern.

On the price side, the new directives to the OPA entail no important departure from its past procedures. Even the concession to review "hardship" cases promptly rather than after six months is only a pious hope, since it is unlikely that OPA is equipped to deal rapidly with the thousands of cases that will arise. A hardship case is defined as one in which, after absorbing an approved wage advance, an industry or establishment in a twelve months' period of normal-rate operation is judged by the Price Administrator likely to operate at a rate of profits to net worth less than it averaged in the base period of 1936-1939.

Let us see what this really means. In the first place, the rate of manufacturing profits in the base period was only moderate. But since the average net worth of manufacturing corporations has increased one-third over what it was in the base period, the application of the OPA formula, *assuming that its Administrator correctly appraises the twelve-month outlook,* seems to provide for absolute profits one-third higher than the 1936-1939 average.

The OPA formula, however, applies to profits *before taxes.* What really matters to stockholders is profits *after taxes.* Corporation taxes have been increased from an average of 17 per cent in the base period to 38 per cent now. This means that the price adjustments granted by OPA on average will yield profits *after taxes* no larger in dollar terms than in the 1936-1939 period, although 1946 manufacturing sales are expected to be more than twice as high. Under this procedure the *ratio* to net worth of profits *after taxes* will be one-fourth lower than the 1936-39 average. This clearly undermines the incentives upon which production at high level depends.

The workers get wage increases which promote inflation. The Government, bailed out from its previous mistakes, gets political credit for raising wages. And the entire bill is handed to American industry for payment.

But the Danger of Inflation is Real

Under these circumstances, there is a growing demand on the part of business groups that price controls be rescinded immediately. It is argued that, once the restrictive influence of price controls is relaxed, capacity production soon will supply sufficient goods to prevent undue price inflation.

It is understandable that business should wish to be rid of Government controls which have operated in such a thoroughly inconsistent and damaging fashion. Unfortunately, there is ground for believing that more harm might result from this cure than from the disease.

There is nothing in our situation that could bring on the kind of inflation that has been experienced by certain countries of Europe and Asia—in which the value of currency deteriorates until it takes a cartload to buy a pair of shoes. But our situation now is definitely more threatening than it was in 1919, after the first World War. At that time wholesale prices and the cost-of-living skyrocketed almost 25 per cent within twelve months. If we discard all controls now, as we did then, prices might easily go up from 25 to 50 per cent in a year's time.

An inflation of that dimension can do tremendous damage. While it lasts, all those dependent upon fixed incomes are damaged—all bondholders, including those who hold war bonds, all life insurance and annuity beneficiaries, all pensioners. Generally, the purchasing power of wages and salaries would shrink, with white collar and unorganized production workers hardest hit. Controlled-rate industries, such as railways and other utilities, would be squeezed. General business would suffer least of all—while the boom lasted.

But such soaring booms cannot last. The 1919 boom burst in mid-1920. By summer of 1921 industrial prices had fallen 40 per cent and industrial production was off 35 per cent; farm prices had fallen 50 per cent. This time the boom might soar higher and last longer, but that would merely result in an even more precipitous drop. Business would be hard hit along with everyone else, and high wage rates would mean nothing to the unemployed.

Controls Must be Consistent and Progressively Relaxed

But if the Nation cannot afford to risk disastrous inflation by immediately abolishing controls, neither can business afford to accept the program which the Administration now proposes.

The wage-price policy will not hold the inflation line so long as the Administration is leading the assault to breach that line on the wage side, as it has done ever since VJ-Day.

The Administration is now going before Congress to ask for a broad extension of its wartime powers for an additional year beyond June, 1946.

Congress must see that this is not granted except upon terms that guarantee the use of such power with a consistency that has been conspicuously absent up to now.

1. It must provide sufficient price relief to yield profits normal to high-level operation.
2. The basis for price relief must be clearly defined and geared to actual costs of operation at the earliest possible date.
3. OPA administrative procedures must be speeded-up and streamlined, or the delays that characterized past administration will become intolerable.
4. It must see that, once established, the new line is held as long as wartime controls are continued by enforcing restrictions on wages as well as prices.
5. It must set an early date for the termination of all wartime controls and provide for progressive and bold steps for de-control to be taken before that date, as soon as production levels in any field are sufficiently high to restrain runaway prices.
6. It must proceed without delay to marshal fiscal and monetary policies to combat inflation, in order that price controls may be discarded at the earliest possible date.

Unless Congress does this—and it will not be easy in an election year—we are headed for an explosion. It will come in one of two forms—either in a continuance of industrial strife, or in a rocketing inflationary boom that can only end in collapse and depression.



President, McGraw-Hill Publishing Co., Inc.

LA-DEL

MATERIAL HANDLING
MINE VENTILATION

Now we can do a Better Job

★ ★ ★ ★ ★

TO ALL OUR FRIENDS, both present and prospective users of La-Del-built equipment, we are happy to announce that as of April 1946, our company officially becomes the La-Del Division of JOY MANUFACTURING COMPANY. This joining of forces, we feel, is most important to you because of the much broader and better service it will enable us to give you.

Organization

Manufacture of La-Del Conveyors, Mine Fans and Blowers will continue in the New Philadelphia, Ohio plant just as before. The same teams of engineering and production specialists will be on the job, building the same efficiency and trouble-free operating qualities into La-Del products that has always characterized them.

Equipment

What's more, the scope of our equipment is in a steady process of enlargement. We're not only continuing to refine and improve existing products, but several new developments in modern mining equipment are on the way and will shortly be announced.

Engineering

To our own research and design staff now is added the extensive engineering facilities of the Joy Laboratories, placing the best features of both at your command, and increasing the vital field engineering assistance that is always ready to go to work for you.

Service

Close personal attention to your *individual* requirements in mine conveyors, fans, etc. has always been the hallmark of La-Del. We assure you that this same fine service is not only retained, but increased—broader in scope, better in every way.

LA-DEL **CONVEYOR AND MANUFACTURING CO.**

New Philadelphia, Ohio

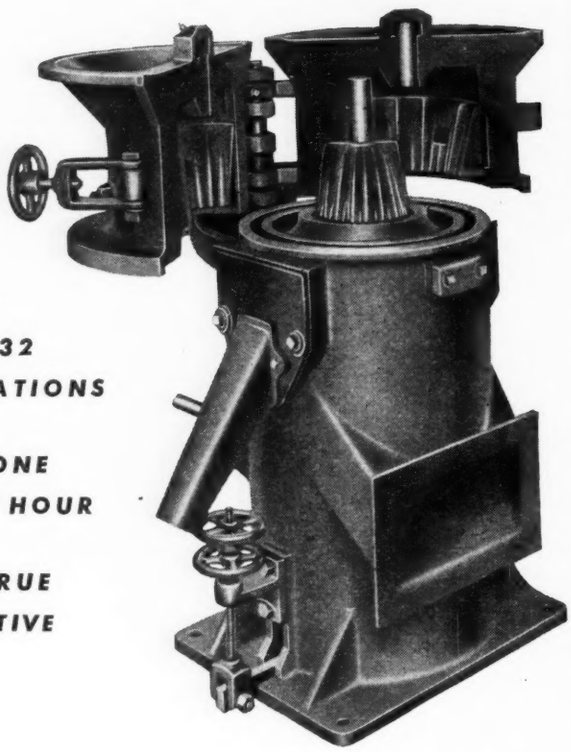
COMPLETE LINE OF UNDERGROUND CONVEYORS FOR LOW COST OPERATION

YOU GET ACCURATE COAL SAMPLES FAST

WITH

STURTEVANT

Automatic Crusher and Sampler



★ ELIMINATES 32 HAND OPERATIONS

★ PROCESSES ONE TON IN ONE HOUR

★ PROVIDES TRUE REPRESENTATIVE SAMPLES

The Sturtevant automatic coal sampler enables you to make accurate coal samples quickly and easily. All you do is feed the coal or coke into the hopper . . . the sampler does the rest, discharging a homogeneously representative mixture through the sample spout ready for analysis.

The Sturtevant method eliminates 32 of 34 hand operations, thus speeds sampling work and cutting costs by providing accurate samples in a few minutes. Get the Sturtevant story. Write for information and bulletin today.

STURTEVANT MILL COMPANY

31 Harrison Square, Boston 22, Massachusetts

Designers and Manufacturers of

CRUSHERS • GRINDERS • SEPARATORS • CONVEYORS
MECHANICAL DENS and EXCAVATORS • ELEVATORS • MIXERS

successful briquet operation and operates plants now at Lykens and Lincoln.

Under the name "Reading Briquets," they are made principally from fine sizes of white-ash anthracite, mixed with a small quantity of asphalt and other ingredients to improve combustion and are pressed into pillow-shaped blocks midway in size between stove and chestnut size coal.

•

Obituary

WALTER OLIVER, who retired Jan. 1 as president and general manager of the Maltby Coal Co., Kingston, Pa., and who also was vice president and general manager of the Kingston Coal Co. and one of the receivers of the latter's closed collieries, died Feb. 13 after an illness of two years.

•

Coal Publications

Machine-Tool Work; Fundamental Principles, by W. P. Turner; revised by H. F. Owen. McGraw-Hill Book Co. 364 pp., 5⅜x8½ in.; cloth; price, $3. A reference book for work on lathes, planers, shapers and on milling, drilling and grinding machines, written by a late professor of practical mechanics and revised by an associate professor of industrial engineering, both of Purdue University.

Industrial Algebra and Trigonometry, With Geometrical Applications, by J. H. Wolfe, W. F. Mueller and S. D. Mullikin, all in charge of training at the Ford Motor Co.'s plant, Dearborn, Mich. McGraw-Hill Book Co. 389 pp., 5½x8⅝ in.; cloth; price, $2.20. This book descends to fundamentals of the subjects treated and is so well illustrated that the text is readily grasped.

The Wagner Act After Ten Years, edited by G. Silverberg, The Bureau of National Affairs, Inc., Washington, D. C. 126 pp., 6x9¼ in.; cloth; price, $2. Eleven articles by as many authors, including Mr. Silverberg. The book discusses the act's beginnings, its impact on the courts and public opinion, its effects, following these with replies to the question "Can the Law Be Improved"? and a "Credo on Collective Bargaining."

Pay Day, by R. Milholland. William Morrow & Co., New York. 240 pp., 8½x5½ in.; cloth; price, $2.50. A factory book, but with suggestions for all kinds of employers, written from plentiful experience and delightfully told. Sometimes Mr. Milholland refers to the mines, and then the references are not so pleasing. He prefers the boiler shop.

Burning Bituminous and Subbituminous Coals on an Anthracite Ash-Removal-Type Domestic Stoker, by H. F. Yancey and K. A. Johnson, U. S. Bureau of Mines. R.I. 3849, 15 pp., 8x10½ in.; paper, mimeograph; free. Non-caking bituminous and subbituminous coals having ash-softening temperatures above 2,600 deg. F. were burned with high efficiency in anthracite stokers, evidencing their suitability for house heating with such coals. High efficiency is obtained with coals with ash-softening temperatures as low as 2,380 deg. F., but noise in crushing clinkers by the stoker's ash-removal mechanism might be objectionable.

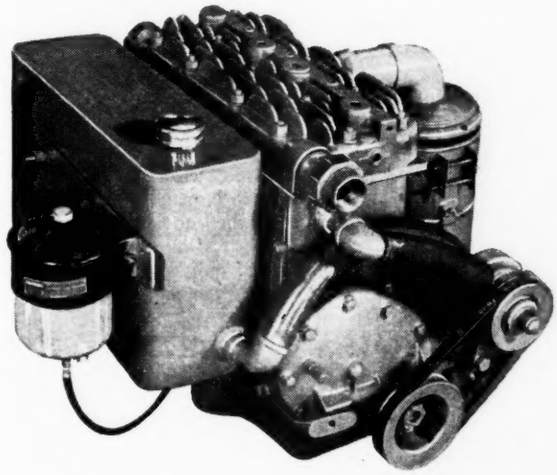
THIS CANTRELL COMPRESSOR IS BUILT FOR RUGGED COAL MINE SERVICE

And You Can Have It For Only $348.00



THE CANTRELL S-101 AIR COMPRESSOR

★ We believe this Cantrell S-101 is the lowest priced compressor unit on the market. But, we know, it will give you maximum efficiency because it is designed especially to meet every requirement of coal mines, and hundreds of them now in use, have proved their dependability in constant service and satisfaction.



The two views above show the Cantrell S-101 Air Compressor completely.

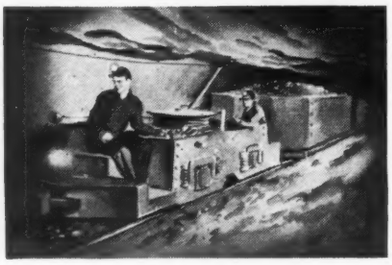
The S-101 is identical to all compressor units used in the complete Cantrell Compressor outfits. The S-101 is shipped complete, as shown, at $348.00 F.O.B. Plant, ready for installation with your motor and air receiver. It carries the same, low cost, factory rebuilt exchange plan as all other Cantrell compressor outfits. Among these are machines to serve every coal mine demand . . . the "S-P", self-propelling compressor and 2-ton locomotive combined—two machines in one . . . the "C-I", rubber tired for trackless mines . . . the "S-L", stationary type or for mounting in mine car.

Make Imperial-Cantrell your source of supply for complete compressor equipment and service. You'll find it pays. Remember, our compressor is our main "dish"!

For immediate details on the S-101, wire, or phone Jellico, Tenn., 292.

Cantrell COMPRESSORS

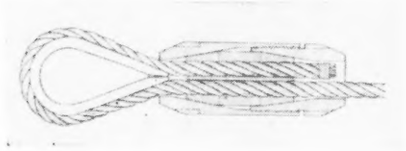
IMPERIAL-CANTRELL MFG. CO., JELLICO, TENNESSEE



Equipment News

Wire-Rope Clamp

A new wire clamp called Cabl-Ox has been developed by the Nunn Mfg. Co., 2125 Dewey Ave., Evanston, Ill., which incorporates a wedging action in its component parts, making it possible to hold



loads in excess of the tensile strength of the rope used. The unit is alloy steel, cadmium-plated for weather protection, streamlined for neat appearance and freedom from obstruction.

•

Accounting Method

Multi-Matic accounting, said to be an entirely new system of accounting and payroll preparation, has been developed by the Systems Division of Remington Rand, Inc., 315 Fourth Ave., New York City 10. Applicable to small and medium-size businesses and the branch-office accounting in large organizations, it has been thoroughly pretested by selected companies.

The basic principle of Multi-Matic accounting is the simultaneous posting of a number of financial or statistical reports by means of a single writing. The patented Multi-Matic accounting board permits the same entry to appear in a number of different columns on separate reports. For example, a single writing prepares pay checks, employees' earnings history records and the payroll register, insuring that identical entries will be correctly distributed to the proper columns of the check stub or voucher, payroll register and individual employee's register card. The system permits similar multi-purpose entries in general ledger accounting.

•

Milling Cutter

Kennametal, Inc., Latrobe, Pa., has developed a new type of milling cutter, called the "Universal" face Kennamill, consisting of a precision-built heat-treated steel body, or tool holder, with a set of detachable solid Kennametal blades (as many as there are inches in the cutter diameter) mechanically held in position.

Five standard sizes now are available: 4-, 6-, 8-, 10- and 12-in. diameter. Blades for these are of the same cross-section and, when shortened by regrinding, can be used in smaller grinders successively. Blades are wedged in the body at fixed angles—15 deg. dish, or concave 7 deg. negative axial, and 15 deg. positive radial.

•

Scrapers

Three sizes of open-bowl scrapers, matched in capacity to the power of Caterpillar diesel tractors and built to perform with them as a complete earth-moving package, are announced by Caterpillar Tractor Co., Peoria, Ill. The new units, designated as Nos. 80, 70 and 60, have respective struck measures of 13.8, 8.7 and 6.0 yd.

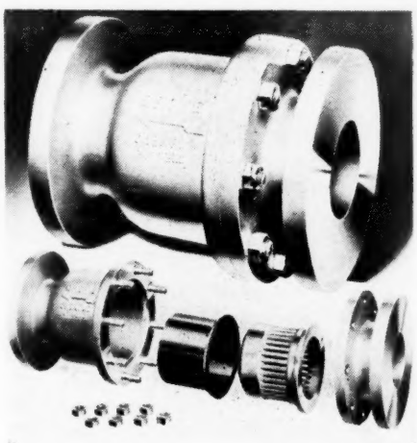
Features of the scrapers pointed out by the manufacturer include: open-bowl design for greater stability, visibility and access for shovel or dragline loading; high apron lift to clear the stickiest materials; positive, clean ejection; long cable life from correct reeving and oversized precision-grooved sheaves; double-curved self-sharpening cutting edges for "live loading" with longer boiling action, digging hard material, shorter loading distance and less loading time; optional tire sizes for correct flotation, tires matched to the job, minimum rolling resistance, bigger pay-loads and long tire life.



•

Check Valve

Grove Regulator Co., 6502 Green St., Oakland 8, Calif., offers the Chexflo valve, which, from the standpoint of design, construction and operation, is said to represent the utmost in simplicity and safety. Operation is effected by a synthetic rubber tube stretched over a slotted cup-shaped metal



core that expands to open and contracts to close.

The flexible tube possesses a uniform and constant spring rate that avoids inertia being set up to cause operation beyond flow requirements. Because of its self-compensating and wear-resistant factors, this unit is said to be particularly suited for handling even the most highly corrosive and erosive air, gases or liquids. Full details in Bulletin 610.

•

Air Conditioning

Anemostat Corp. of America, 10 East 39th St., New York 16, announces that the Anemostat air diffuser, used to eliminate drafts in air-conditioned planes as well as in air-conditioned plants, is available again for commercial purposes. These units are said not only to eliminate drafts but also to equalize temperatures inside air-conditioned inclosures to within 0.5 deg. F. if necessary, humidities being equalized within corresponding limits.



Precisionbilt LIKE A GIANT REFLECTING TELESCOPE

J&L WIRE ROPE

PERMASET PRE-FORMED

A giant reflecting telescope is built with precision. J&L Permaset Pre-formed Wire Rope is also Precisionbilt by men of experience and skill using the finest materials.

J&L Wire Rope is made of J&L Controlled Quality steel. Our engineers will be glad to discuss your requirements with you. Write for further information.

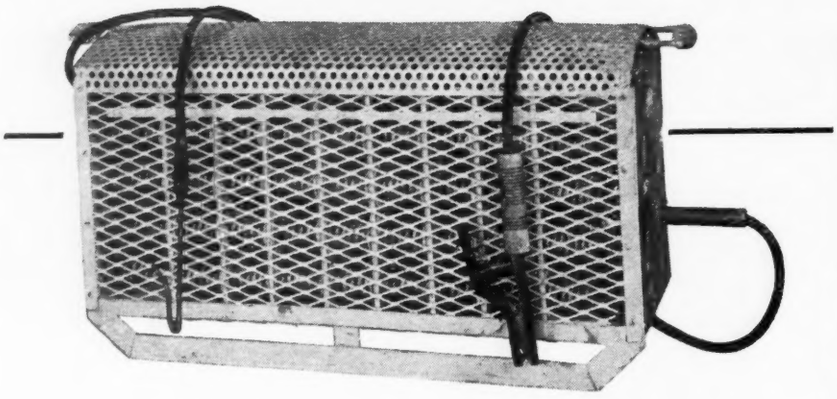
J&L STEEL

JONES & LAUGHLIN STEEL CORPORATION

GILMORE WIRE ROPE DIVISION

PITTSBURGH 30, AND MUNCY, PENNSYLVANIA

J&L *Precisionbilt* PERMASET PRE-FORMED WIRE ROPE



easy to move . . . easy to use

The G.M.C. Portable Arc Welder can be brought to the job, hooked up, used and moved out easily and quickly. Handles are located conveniently *away* from the coils, eliminating wasted time waiting for the unit to cool off. Coils are protected from all sides and the unit is sturdily constructed to take hard use. If you are looking for a practical *portable* Arc Welder this is the answer!

G.M.C. Portable ARC WELDER

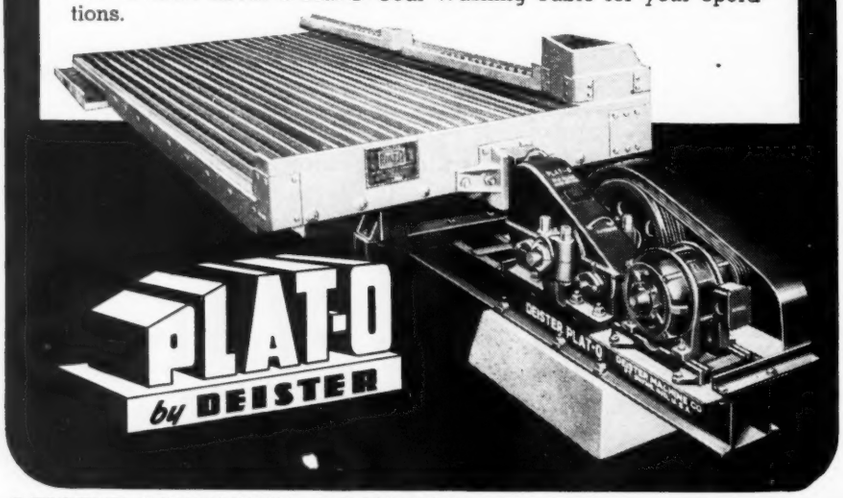
for 250 or 500 Volt D. C.

GUYAN MACHINERY CO. LOGAN WEST VA.

There is PROFIT in FINER SIZES

No size is too small for the Plat-O Coal Washing Table to reclaim efficiently. For this reason, waste piles and culm banks which once were written off as total losses have become important sources of clean coal . . . important sources of *profit* . . . to the many operators who have installed Plat-O Tables. The Plat-O Table is inexpensive to install and maintain . . . separation is automatic and always in full view so that one man can watch up to 20 tables.

Take a tip from the owners who have found that there is profit in finer sizes and ask Deister Machine Company Engineers today for the facts about a Plat-O Coal Washing Table for your operations.



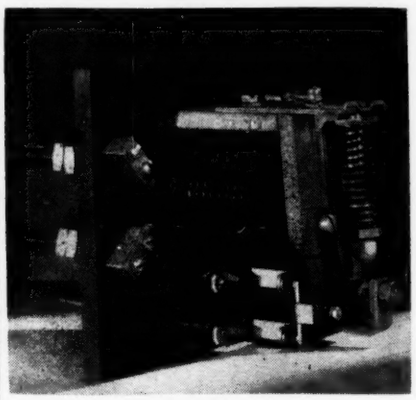
DEISTER MACHINE COMPANY, Fort Wayne 4, Indiana

Designed to distribute air of any duct velocity in a multiplicity of strata traveling in all directions, the Anemostat is said to create a series of countercurrents that siphon into the device room air equal to about 30 percent of the supply air. This room air is mixed with the supply air within the diffuser before the air mixture is discharged into the room. The velocity of the discharged air is instantly reduced by air expansion within the device. In this way, air of any duct velocity is diffused noiselessly and evenly, thoroughly and draftlessly throughout the room, closely equalizing temperature and humidity and preventing air stratification.

•

Overload Relays

To provide almost instantaneous magnetic overload protection on general-purpose and mill motor applications, and to prevent damage to hoist, windlass and capstan equipment when the load or cable jams on control, a new Type AYJ relay for d.c. operation is offered by the Westinghouse Electric Corp., East Pittsburgh, Pa.



The single-break normally closed main contacts and the double-break auxiliary contacts are suitable for carrying 5 amp. continuously and for interrupting a d.c. inductive coil load of 150 volt-amp. maximum. Type AYJ relays are operated by a series of copper-strap-wound type of coil. Coils and coil studs are available for currents ranging from about 75 to 625 amp. The coils and auxiliary contact parts are insulated from the relay frames for 600 volts.

Of strong unit construction with a knife-edge bearing between the armature and the frame, the relays have ground armature and frame surfaces plated with hard chromium for protection against corrosion and wear.

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Slusher

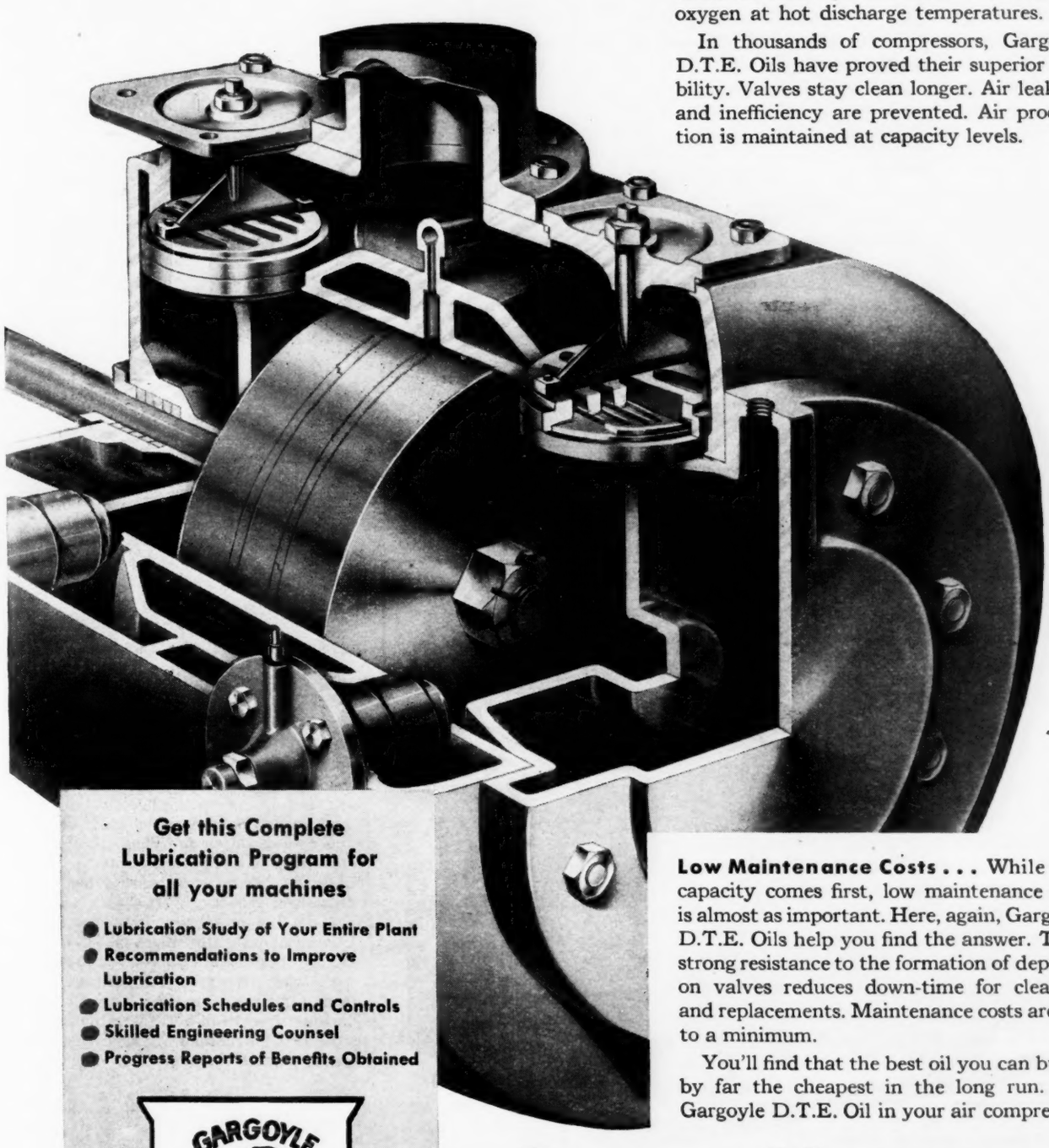
Sullivan Machinery Co., Michigan City, Ind., announces a new line of short-length slushers in two- and three-drum models. Gearing is considerably stronger than in any previous Sullivan slushers in this class but the units have a shorter over-all length and occupy less space.

A recurring problem in the mining industry, it is pointed out, is the necessity of using air-driven equipment at times when electric equipment is not available in certain areas until wires are strung and switches installed. With a Type FF slusher, however,

What do you expect from your Compressor?

Continuous Full Power . . . For maximum efficiency, your air compressor valves must stay free from clogging oxidation deposits. This calls for a compressor oil with high chemical stability to resist the attacks of oxygen at hot discharge temperatures.

In thousands of compressors, Gargoyle D.T.E. Oils have proved their superior stability. Valves stay clean longer. Air leakage and inefficiency are prevented. Air production is maintained at capacity levels.



Low Maintenance Costs . . . While full capacity comes first, low maintenance cost is almost as important. Here, again, Gargoyle D.T.E. Oils help you find the answer. Their strong resistance to the formation of deposits on valves reduces down-time for cleaning and replacements. Maintenance costs are cut to a minimum.

You'll find that the best oil you can buy is by far the cheapest in the long run. Get Gargoyle D.T.E. Oil in your air compressor.

Get this Complete Lubrication Program for all your machines

- Lubrication Study of Your Entire Plant
- Recommendations to Improve Lubrication
- Lubrication Schedules and Controls
- Skilled Engineering Counsel
- Progress Reports of Benefits Obtained

GARGOYLE Lubricants

Socony-Vacuum Oil Company, Inc.

and Affiliates: Magnolia Petroleum Co., General Petroleum Corp. of Calif.

Tune in "Information Please"—Monday Evenings, 9:30 E.S.T.—NBC



Employers are Human, too!

Mr. Employer, do you have your daily operations insured from an employer-employee standpoint?

Workmen's Compensation is necessary, and in most cases compulsory ...then there are individual or group policies for your personnel ... and our new Underground Property Damage policy that protects YOU against loss or damage to all equipment underground—damage to shafts, passageways, retimbering and repairing inside structures—plus damage to property above ground as result of an explosion underground.

Our Safety Engineers, authorities in their field, offer you suggestions as to the prevention of accidents in your operations.

We are proud of our record of claims service—not only for coal mining companies, but for commercial and industrial organizations, too. From the most serious claims to the smallest ones, we keep in mind the rights of the employer as well as the employee.

For detailed information about these particular policies and others, please write or phone your local insurance agent.

COAL OPERATORS CASUALTY COMPANY
PITTSBURGH 22, PA.

Lee-Norse
"MINE JEEP"

Used by—

Mine Officials, Mine Inspectors, Mine Repairmen, Maintenance Crews, Mine Surveying Crews, Rescue Workers, Visitors and Others.



A special vehicle for underground transportation of personnel. Handles five men. Hauls men to working face quicker, without fatigue, enabling them to do a better job.

We completely overhaul and factory rebuild various kinds of mining machinery—cutters—loaders.

Phone
Charleroi 750

Lee-Norse Company
CHARLEROI PA

the air motor can be replaced with an electric drive in a few minutes at the working place. For the first time, on units of this size, it is said, Sullivan supplies the automatic anti-backlash weight-actuated band-type no-spin snubbing brakes.

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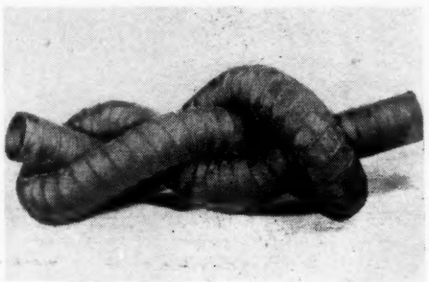
Air Hose

Goodyear Tire & Rubber Co., Akron, Ohio, offers new air hose which it says is manufactured under an exclusive method of bonding cover, carcass and tube together with much greater adhesion strength than previously obtainable. This new process is said to produce a lighter hose with much thinner wall gage but greater strength, flexibility and longer life than hose of equal inside diameters. It is manufactured in light, medium and heavy-duty types, providing a wide range of adaptability to various jobs.

•

Flexible Tubing

Warner Brothers Co., Spiratube Division, Bridgeport, Conn., offers a new type of flexible tubing, said to be non-collapsible under plus or minus pressures and retractable to about one-eighth its extended length, for portable or semi-permanent ventilation or any handling of air, gases or light solids. Its spring steel helix core causes it to spring out, like a jack-in-the-box, to its fully extended length, and it will stay in this position regardless of whether it is working on pressure or suction.



One of the features of its construction is the method of spiral-stitching the spring core within the fabric. The inside surface is free of wire ridges, providing less resistance to air flow and no obstruction to the passage of solids. Sharp bends can be made with only slight reduction of air flow and without the use of elbows or special fittings. Considerably lighter than metal duct or molded tubing, it is said to take up less space when retracted. The standard Spiratube is made of long-fiber duct, having a bursting strength of 170 p.s.i.; the fabric is processed fire-resistant and covered with tough, durable thermoplastic.

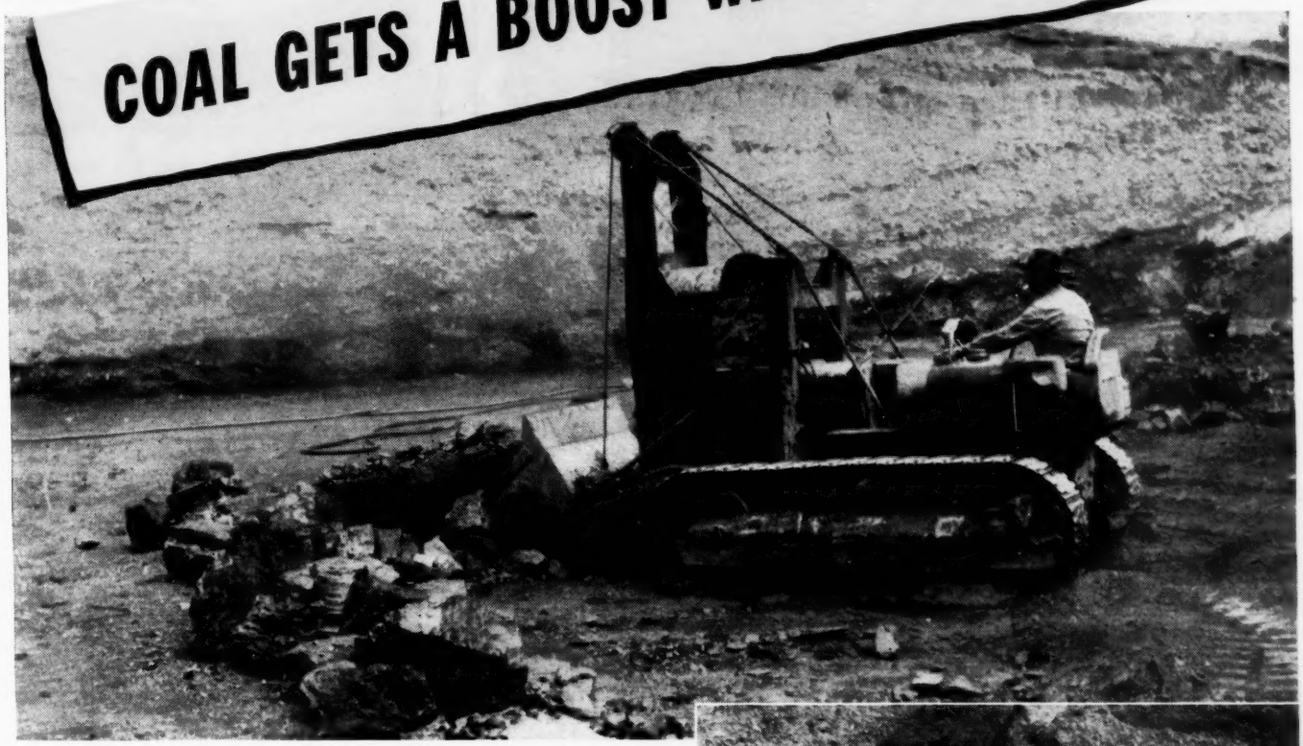
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Tire Protectors

Shinguards for mine shuttle-car tires that take a heavy beating are offered by the Goodyear Tire & Rubber Co., Akron, Ohio. These tire shields are circular protectors of $\frac{3}{8}$-in. steel that may be applied easily and quickly, extending far enough up on the tire to protect the sidewall area, where cutting and snagging might otherwise occur.

Use of these shields, according to the

COAL GETS A BOOST with this machine





Here's a handy tool in any strip mining operation—a "Caterpillar" Diesel D4 Tractor equipped with a Trackson Traxcavator. These photographs show it loading coal on trucks in the Tri-County Coal Company's strip mine at Russellville, Arkansas. It works fast and efficiently and handles the coal with the least possible breakage.

There are plenty of other ways in which the tractor can be used to advantage. With a bulldozer replacing the bucket on the front it can build ramps and access roads, clean the face of the coal and push material up to the stripping shovel. It can dig drainage ditches, build railroad grades and move track.

"Caterpillar" Diesel Tractors aren't afraid of work. They're built tough—built to take a lot of punishment, day after day, and come back for more. It's that rugged stamina that keeps them on the job with a minimum of down time—gives them long working life and low maintenance costs.

When you buy a "Caterpillar" Diesel you know every inch of it, including the matchless fuel system, is honest "Caterpillar" construction. And you know it's backed by the best equipped dealer service organization in the industry.

Your "Caterpillar" dealer understands your job. You can rely on him for sound counsel in buying any kind of earthmoving equipment.

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

CATERPILLAR

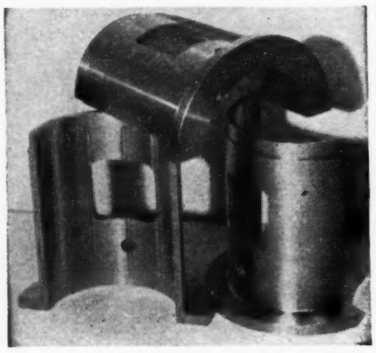
REG. U.S. PAT. OFF.

ENGINES • TRACTORS
MOTOR GRADERS
EARTHMOVING EQUIPMENT

DIESEL

The discharged veteran wears this emblem. Remember his service and honor him.

All Bearing Materials Are Not Alike



Specializing in bronze bearings and bushings for coal mining equipment, with a specific formulae, designed for each application, we give you a money-back guarantee of longer service, lower maintenance cost.

Promet Bearing Bronzes can be run without lubrication in emergencies, even at red heat, suddenly cooled and returned to service without injury. Will not cut, stick to the shaft under ordinary conditions, nor powder under severest service. Can be machined at more than 500 feet per minute—twice as fast as phosphor bronzes.

PARTS FOR ALL EQUIPMENT. Jeffrey, Goodman, Westinghouse, General Electric, Sullivan, Joy, Oldroyd, etc.

Rounds, hexagons, squares, bar stock. Rough cast, semi-finish, fully machined. Cored stock all sizes (by ⅛" steps) from ½" minimum core to 12" O.D. and 12" lengths.

PROMET BRONZE CASTINGS TO YOUR PATTERNS. Any size, shape or section, up to 5,000 lbs. each. Pattern making, designing and machining.

PROMET MINE SPECIAL BABBITT. Has a lead base, and fine velvety grain. Withstands tremendous loads at high speeds and temperatures. The coefficient of friction is considerably less than that of tin babbitts, reducing power loss and wear. Entire bearing surface wears uniformly without pitting. Manufactured entirely from pure virgin metals, perfectly alloyed and heat-treated. Unaffected by moisture. Simply heat to 900°-950° F. and pour. Can be heated to 2000° F. without injury. Repouring only refines it. No appreciable shrinkage, hence a better contact with supporting shell; a more solid, rigid bearing. Contains practically no dross. Supplied in 10 lb. pigs.

Write for booklet

PROMET THE Engineered BRONZE

THE AMERICAN CRUCIBLE PRODUCTS CO.
1307 Oberlin Ave., Lorain, Ohio, U. S. A.

Prompt deliveries can usually be made from stocks maintained at

BECKLEY, W. Va., The Universal Supply Co., Corner 2nd Ave. and 2nd St.	Phone 3442
LORAIN, OHIO, The American Crucible Products Co.	Phone 6941
WILLIAMSON, W. Va., Williamson Supply Co.	Phone 1200

Other Representatives

ALTON, ILL., Frank E. Rhine, 623 Blair Ave.	Phone Alton 3-8628
BIG STONE GAP, VIRGINIA	C. P. Cawood
BIRMINGHAM 1, ALA., O. D. Lindstrom Equipment Co.	P. O. Box 183
CANTON, OHIO, Bowdil Company, Waynesburg Road	Phone 29-808
MT. LEBANON, PA., J. E. Nieser, 720 Roselawn Ave.	Phone LE 9876
DENVER, COLO., Urquhart Service, 16th Street at Blake	Phone Main 0331

Operators say—"20% MORE EFFICIENT than average Storage Battery Locomotive"

THE GREENSBURG "MONITOR"



12 MONITORS

In use by Franklin County Coal Corporation
8 at Herrin, Ill. *4 at Royalton, Ill.*

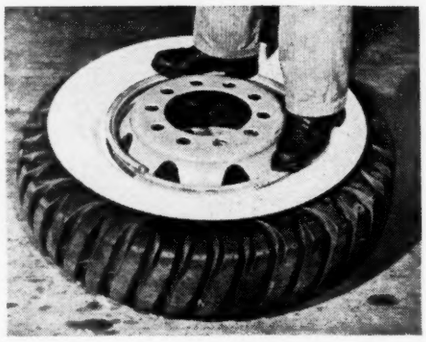
FEATURES

Double knee-action; better trackability. Floating power; less power consumption. Quick acting footbrake, essential for quick stopping, especially behind loading machines. Brake shoes that follow the wheels (due to knee-action). Adjustable Timken Bearings throughout. Huskiest transmission in any storage battery locomotive. Never leaks oil. Never add oil. Use regular auto oil; change every 6 months. Strong. Simple Design. Low maintenance. Backed by over 25 years of experience with Storage Battery locomotives.

The Greensburg "Monitor" Type is the first real improvement in storage battery locomotives. ENTIRELY NEW IN DESIGN. Its efficiency and economy have been proven in actual mine use. Operators report 20 to 25% more coal hauled than with other battery locomotives having the same battery capacity. From 6 to 10 ton capacities: track gauges 36" to 56½". Other locomotives from 1½ tons to 10 tons, 16" to 56½" track gauge.

MORE HAULING FOR LESS STORAGE BATTERY CAPACITY

THE GREENSBURG MACHINE CO.
Makers of Custom-Built Storage Battery Locomotives
101 STANTON ST., GREENSBURG, PA.



manufacturer, has furnished the answer to many tire-failure problems in coal mines, where shuttle cars must move over sharp edges of fallen slate and rock and against projecting pillars of coal. No change in tire pressure is required.

The shields clear the tire safely, giving plenty of room for normal flexing without chafing of the sidewall. Shields on shuttle cars are designed for Goodyear L-type rims. They fit in place approximately in the same position taken by the rim side flange, and are held in place by lock rings, which are furnished with the shields.

•

Riveting Hammer

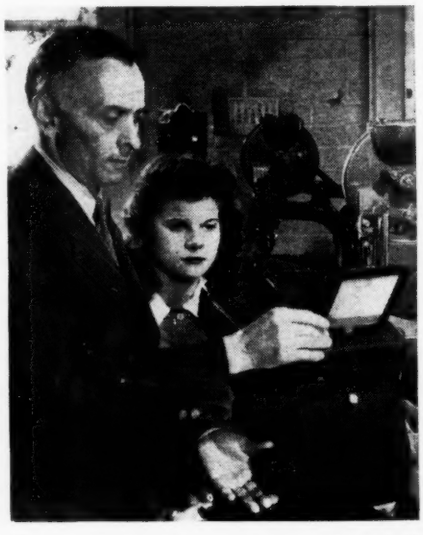
A new line of riveting hammers, known as the "Air-Horse," featuring small size, light weight and strong construction, is offered by the Ideal Commutator Dresser Co., 1013 Park Ave., Sycamore, Ill.

Other features are said to include perfect balance, hand-fitting grip design, ease of operation and controllable speed. The harder it works, according to the manufacturer, the cooler it becomes because of the expansion of air, which is exhausted from the front at the operating head.

•

Vision Checking

A new vision-checking program to spot quickly employees who need an eye examination and correction is announced by the American Optical Co., Southbridge, Mass. Detection of the visually unfit under the new program, the company explains, is made with the aid of the AO sight-screener, which





Exclusively yours...

WHEAT

THE *EFFICIENT* CAP LAMP

FOR *SAFER* AND MORE *PRODUCTIVE* UNDERGROUND LIGHTING

WHEAT GIVES YOU THESE EXCLUSIVE BENEFITS

1. 20% Brighter light at working face.
2. Compact, lightweight, balanced, streamlined.
3. Steady, dependable light; 80% efficient at *the end* of shift.
4. Emergency bulb means miner is never in the dark.
5. Simple, fool-proof, self-service charging system—battery charged through headpiece and cord of lamp.

We've been exclusively yours for more than thirty years. Because Koehler mine lighting specialists know that in underground work better light is the key to higher productivity *with safety*, they have devoted more than a generation to making and improving Wheat—the *efficient* cap lamp.

Wheat is exclusively yours for greater, safer production. This famous cap lamp is brighter and steadier. It puts *20% more light on the working face,* always maintains the brightest light and efficiency throughout the entire shift. Studies show that productivity can be increased more than 20% with a corresponding decrease in the accident rate.

We're still exclusively yours, for Koehler is continually striving to improve this modern lamp because it knows that better light underground means safer and greater productivity.

KOEHLER — THE OLDEST COMPANY MANUFACTURING APPROVED MINERS' LAMPS

Write today—

WHEAT LAMP SALES CO.

1501 Kanawha Valley Bldg.
Charleston, W. Va.

MANUFACTURED BY

KOEHLER MFG. CO.

MARLBORO, MASS.

SPECIALISTS IN MINE LIGHTING FOR MORE THAN 30 YEARS



OTHER SALES REPRESENTATIVES

E. D. BULLARD CO.
San Francisco
Chicago

B. C. EQUIPMENT CO., LTD.
Vancouver, B. C.

H. C. BURTON & CO.
Hamilton, Ontario

OLDHAM & SON, LTD.
Manchester, England

NEW LIFE FOR OLD CABLES

7 Point Superiority



1 Double grip . . . both sides adhesive.

2 Great tensile strength . . . tough.

3 Won't tear, ravel or pucker.

4 Resists abrasion.

5 Acid- and alkali-proof.

6 Extra thick . . . one layer insulates.

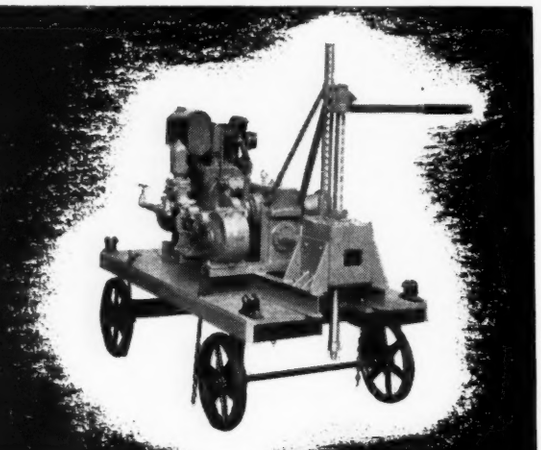
7 Exceeds A.S.T.M. specifications by 300% in adhesiveness, 26% in tensile strength, 290% in dielectric strength.

RUBEROID

INSULATING TAPE

The RUBEROID Co., Executive Offices, 500 Fifth Avenue, New York 18, N. Y.

CORE DRILLING FOR COAL



RUGGED PORTABLE CORE DRILLS

Acker Drills are simple to operate and easy to move in rough country.—They can be mounted on a small motor truck—drag—or trailer.

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Determine depths of overburden before strip mining and thickness and quality of coal seams.

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Tools and equipment for all sub-surface exploration.

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Send for literature

ACKER DRILL CO. SCRANTON 3, PA.

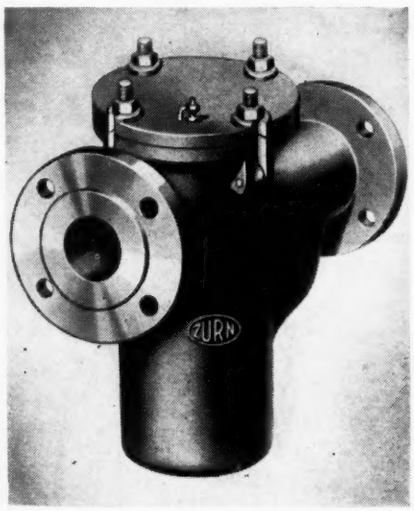
is portable and can be carried directly into a factory for checking each employee's visual performance. Data on 14 different visual functions, it is said, can be obtained through the instrument in three or four minutes.

•

Pipeline Strainer

J. A. Zurn Mfg. Co., Erie, Pa., offers a pressure and suction pipeline strainer said to maintain maximum liquid flow through piping systems while performing the necessary function of protecting pumps and moving parts of other vital equipment that might be injured by foreign particles.

On the cover of the unit is an air-pressure relief valve to permit the escape of air that builds up within the unit and impedes the operation of the strainer and other pipeline mechanisms. The unit also can be furnished with a magnetized strainer basket to intercept ferrous metal particles too small to be intercepted by the strainer.



Available for either high or low pressures, high pressure strainers have a removable drop-bolted cover while low-pressure strainers have yoke-clamp covers. Strainer basket is removable for cleaning. The unit also is available with a clean-out plug for blow-down cleaning when practical. Depending on requirements, the units are made in cast bronze, steel, semi-steel, iron or alloyed metals.

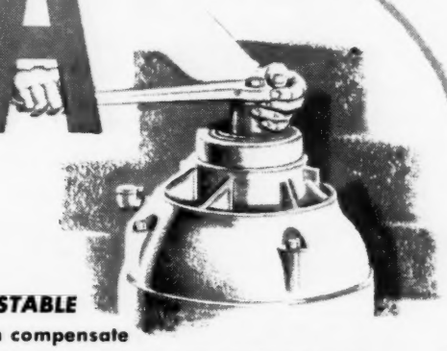
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Protective Mask

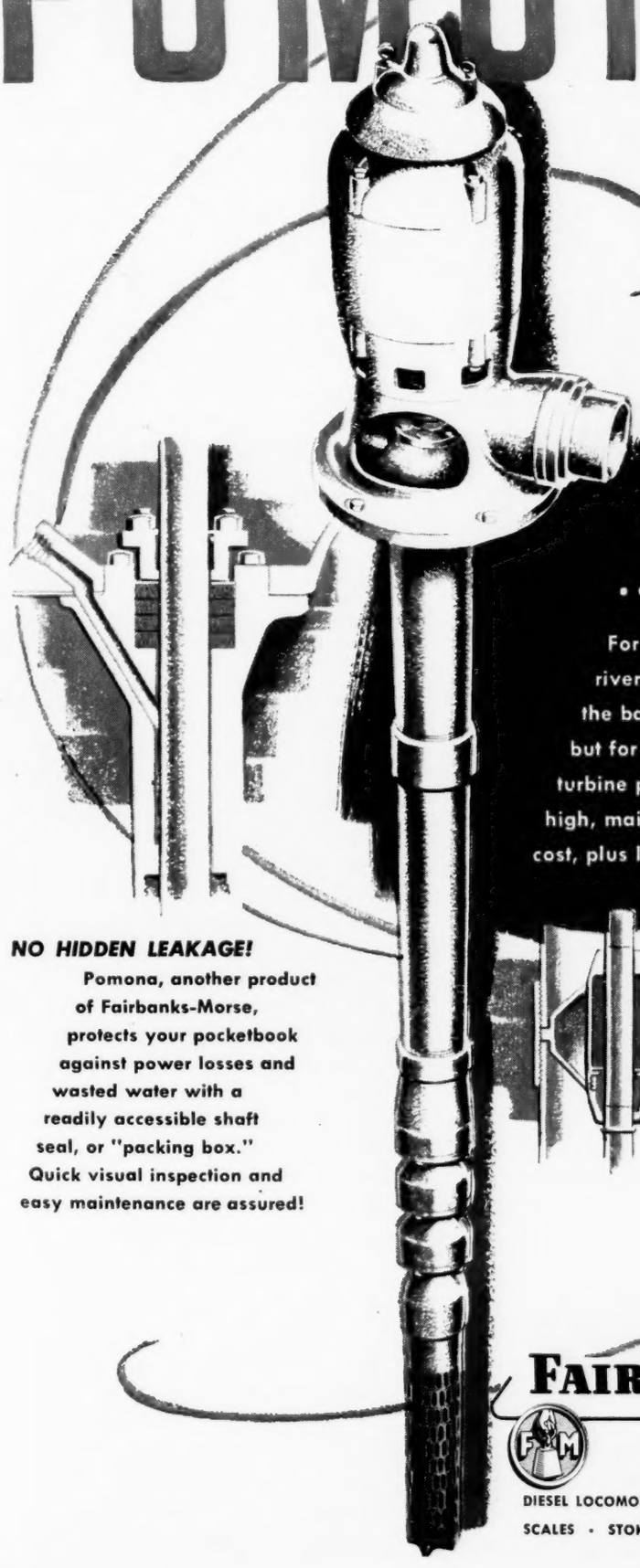
Mine Safety Appliances Co., Pittsburgh, Pa., offers the M.S.A. Chemox oxygen breathing apparatus. Employing a replaceable chemical canister, this apparatus generates its own oxygen and gives the wearer one hour's protection in unbreathable air. Weighing but 13½ lb. complete, and with no cylinders, high-pressure valves or fittings, the new apparatus is recommended for meeting any emergency where high concentrations of poisonous gas or oxygen deficiencies are encountered.

A principle is employed by the mask to generate its own oxygen supply, operating independently of the outside air. This chemical combination in a simple canister is said to create oxygen by merely breathing into it. Exhaled breath passes from the "all-vision"

POMONA



ADJUSTABLE You can compensate your Pomona pump for wear—restore proper running clearance when at last it's necessary—by one simple "topside" adjustment. No need to pull the pump to eliminate recirculation; no high adjustment costs—and valuable pumping time is saved!



Where there's a well ...here's the way!

For pumping water from wells, pits, sumps, lakes, rivers, etc., here's the way to cut costs per gallon to the barest minimum—not only in the first year, but for many, many years to come! Pomona vertical turbine pumps have the combination you're after—high, maintained efficiency for continued low power cost, plus lowest yearly maintenance expense!

NO HIDDEN LEAKAGE! Pomona, another product of Fairbanks-Morse, protects your pocketbook against power losses and wasted water with a readily accessible shaft seal, or "packing box." Quick visual inspection and easy maintenance are assured!

WHAT DO YOU NEED? The patented Pomona revolvable, water-lubricated rubber bearing with double (inside and out) bearing surfaces means quiet vibration-free shaft support under all conditions. Fairbanks-Morse vertical turbine pumps are built in sizes from 4" to 36"—with oil or water-lubrication—semi-open or enclosed impellers. Call your nearest Fairbanks-Morse office or your Pomona dealer for information on the pump best fitted to your job.

FAIRBANKS-MORSE

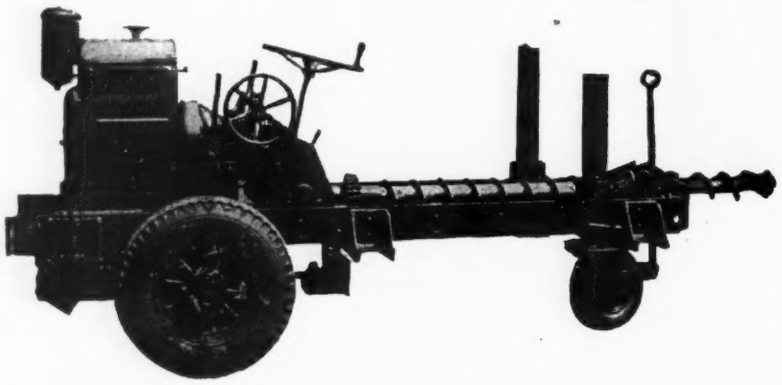
A name worth remembering

DIESEL LOCOMOTIVES • DIESEL ENGINES • MAGNETOS • GENERATORS • MOTORS • PUMPS
SCALES • STOKERS • RAILROAD MOTOR CARS and STANDPIPES • FARM EQUIPMENT

PARMANCO Horizontal Drills

"Positive Control Drilling"

Parmanco Horizontal Drills give you "Positive Control Drilling." Parmanco Vertical and Horizontal Drills are today's leaders in low cost, low maintenance drilling—All Parmanco Drills are equipped with patented Parmanco augers. Used by leading strip mine operators—Write us your drilling problems.



PARIS MANUFACTURING CO.
PARIS, ILLINOIS

FLEXIPIPE

The improved flexible tubing for mine and tunnel ventilation

This flexible air tubing is ready for immediate, easy installation. On account of its flexibility, it can be put up or taken down in a fractional part of the time required by a more rigid means of face ventilation.

Write for free sample and full information.

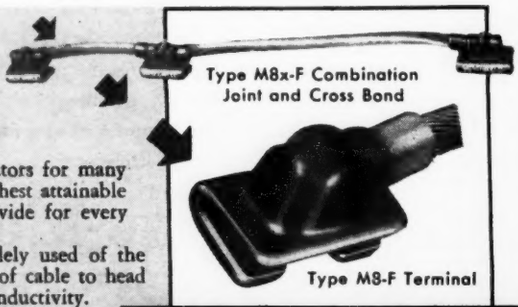
BEMIS BRO. BAG CO.
412 Poplar Street, St. Louis 2, Mo.

MESCOWELD RAIL BONDS

In use by leading coal operators for many years . . . conceded to have highest attainable conductivity . . . 18 types provide for every requirement.

● Type M8-F is the most widely used of the Mescoweld line. Flashwelding of cable to head assures perfect contact and conductivity. The combination M8-F and M8x-F reduces mine welds from four to three.

IMMEDIATE DELIVERIES
WRITE FOR CATALOG



MOSEBACH
Electric & Supply Co.
1115 Arlington Ave., Pittsburgh 3, Pa.

facepiece through the exhalation tube and into the canister, where carbon dioxide is removed. Evolved oxygen flows into the breathing bag reservoir, then to the facepiece through the inhalation tube. Before the canister is exhausted, a preset alarm bell rings a warning to replace the canister with a fresh one.

•

Carbon Brush

An exceptionally wide band of commutation, high stability and long service life are among the advantages claimed for a new carbon brush developed by the Speer Carbon Co., St. Marys, Pa., for many types of electrical motors and generators. Known as Grade No. 4029, this new Speer brush is said to have demonstrated its ability through tests to reduce commutator wear and maintenance. The maker also recommends it for generators and traction motor units. It is offered as a standard single-piece brush or in the Speer "Multiflex" construction.

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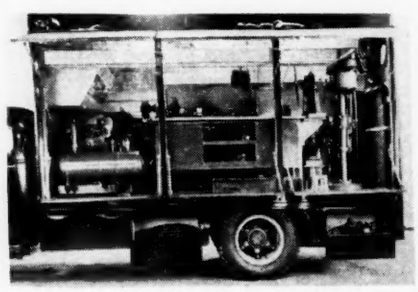
Portable Machine Shop

Production of a complete truck-mounted repair shop for use of concerns operating over extended areas has been announced by the Davey Compressor Co., Kent, Ohio. Suitable for mounting on any standard long-wheelbase truck, the shop assembly—known as the Davey mobile repair shop—contains virtually every item of equipment needed for mechanical repair and maintenance work.

While it is possible to obtain almost any desired combination of equipment, the Davey company has worked out a number of standard assemblies for the use of specific operators. For example, one assembly includes as its main units a 60-cu.ft. Davey compressor, 300-amp. Lincoln welding generator, 5-kw. Westinghouse power generator, 14-in. South Bend lathe (with complete lathe accessories and tools), and a drill press of 1-in. capacity.

Auxiliary accessories are the same as those found in any stationary machine shop. They include a blacksmith's forge and tools; two sets of fitter's equipment; a set of boiler maker's hand tools; ½-ton hoist; two 10-ton jacks; hand-operated hoisting winch; plumber's tool kit; set of wood and steel drills; set of electrician's hand tools; 30-cu. ft. acetylene generator; gas welding and cutting equipment; oxygen bottles; electric welding accessories; grinder with drill grinder attachment; drill press, 1 in. diameter; hand pneumatic drill; pneumatic hand grinder; two pneumatic riveting hammers, two pneumatic drills; soldering irons; emergency lights; ax, pick, saw, air hose, shovel, etc.

Key to the entire assembly is the Davey split-propeller power take-off. This device,

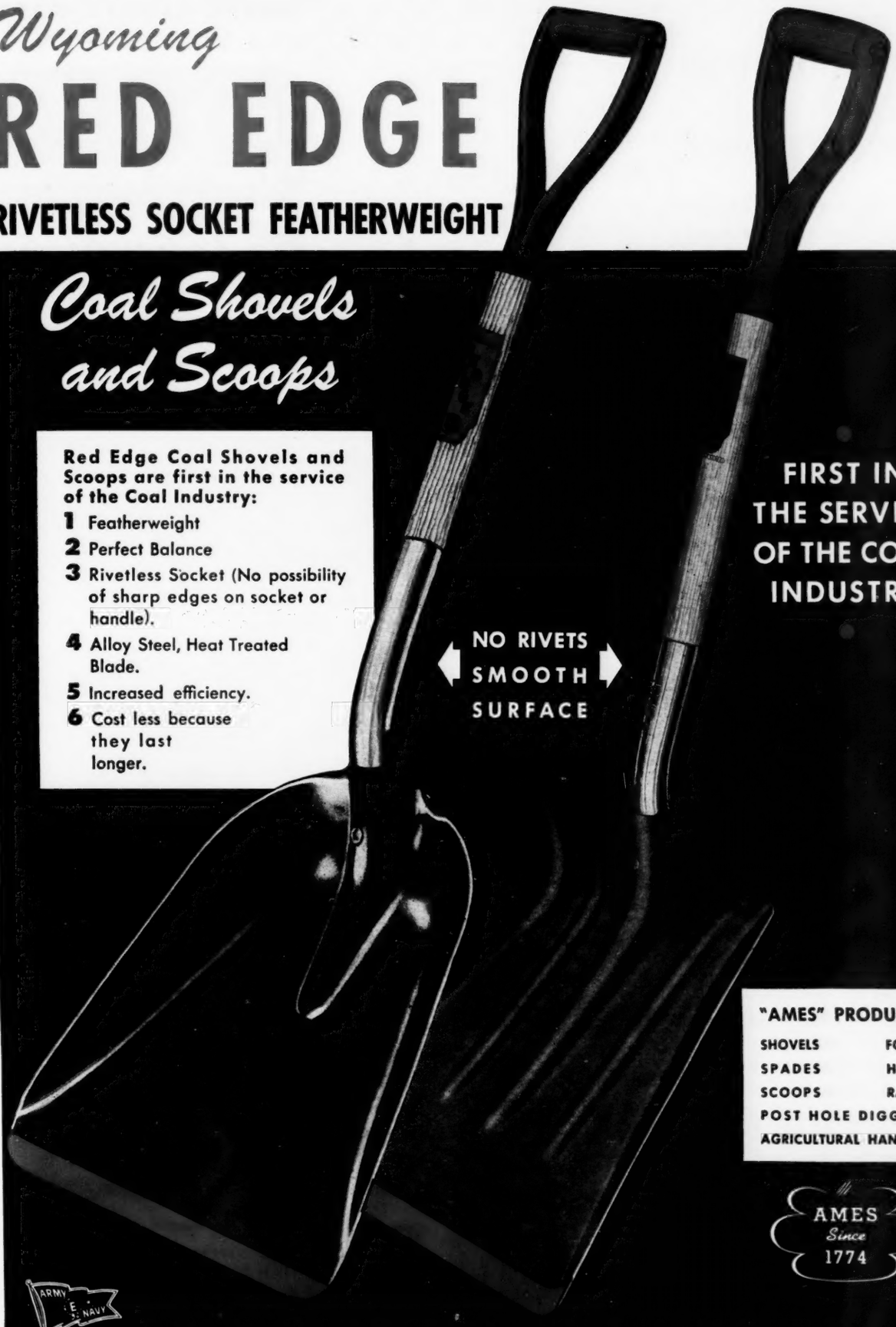


Wyoming

RED EDGE

RIVETLESS SOCKET FEATHERWEIGHT

Coal Shovels and Scoops



Red Edge Coal Shovels and Scoops are first in the service of the Coal Industry:

1. Featherweight
2. Perfect Balance
3. Rivetless Socket (No possibility of sharp edges on socket or handle).
4. Alloy Steel, Heat Treated Blade.
5. Increased efficiency.
6. Cost less because they last longer.

NO RIVETS
SMOOTH
SURFACE

FIRST IN THE SERVICE OF THE COAL INDUSTRY

"AMES" PRODUCTS

SHOVELS	FORKS
SPADES	HOES
SCOOPS	RAKES
POST HOLE DIGGERS	
AGRICULTURAL HANDLES	

AMES *Since* 1774

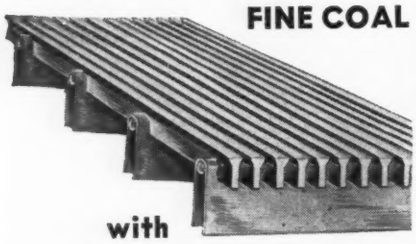
ARMY E NAVY

AMES BALDWIN WYOMING CO.

PARKERSBURG, W. VA. NORTH EASTON, MASS.

INCREASE PRODUCTION LOWER MAINTENANCE

SIZING AND DEWATERING FINE COAL



with

The Profile-Bar

WEDGE-BAR SCREEN

with

Continuous Slot Openings Enlarging Downward

WEDGE-BAR means continuous slots. No cross wires, loops or non-perforated areas. Downward enlarging slots draw moisture and undersize from screen surface. U-Holder supports mean maximum carrying capacity and rigidity, minimum weight.

WEDGE-BAR Sections are specially designed and fabricated to do your job and fit your equipment for the most efficient screen performance and longest life. Our data sheets are available for your convenience in supplying data we need to make our recommendations — without obligation on your part. Write us.

Shaker Jackets • Vibrating Screen Panels • Chutes • Conveyors • Dryers

WEDGE-BAR SCREEN CO.

640 W. 134 St., New York 31, N. Y.

inserted in the drive shaft of the truck, transmits all of the power of the truck engine to the driving of the air compressor, welding generator and power generator. Its use eliminates the need for separate driving engines for each piece of equipment.

•

Industrial Notes

OHIO BRASS CO., Mansfield, Ohio, has elected Charles K. King to the newly created post of chairman of the board, besides naming him as chairman of the executive committee. George L. Draffan, executive vice president since 1928, succeeds Mr. King as president. R. B. Black, a member of the board of directors since 1930, has been appointed to the executive committee. K. V. Farmer, manager of the Canadian Ohio Brass Co. for 15 years, has been elected vice president of that subsidiary. Other officers named are: H. S. Black, senior vice president; L. W. Olson, vice president; J. M. Strickler, vice president; and W. A. Springer, secretary and treasurer. A branch office has been opened at 1317 New York Ave., Washington 5, D. C., to serve Maryland, District of Columbia, Virginia and part of West Virginia. E. W. Leahey, recently discharged as a lieutenant colonel after four years in the Army and previously connected with the Philadelphia office of Ohio Brass since 1937, will be in charge of the new office.

WESTINGHOUSE ELECTRIC CORP., East Pittsburgh, Pa., with 38 plants scattered from coast to coast, has named Gwilym A. Price as president, vice George H. Bucher, resigned. As vice chairman of the board of directors, Mr. Bucher will be chairman of the Westinghouse Electric International Co., which controls all of the export trade of the parent company. A. W. Robertson, chairman, who has reached retirement age, will continue as a member of the organization in a less active capacity. John K. Hodnette has been appointed as manager of the transformer division at Sharon, Pa., vice H. V. Putnam, vice president in charge of the transformer division deceased.

IRON FIREMAN MFG. CO. has appointed L. N. Zimmerman, Howard B. Weeks and Gale B. Robinson as district representatives in the midwest and central division. Zimmerman will cover southeastern Michigan and northwestern Ohio, with headquarters in Detroit. Weeks will have headquarters in Decatur, Ill. Robinson will have headquarters in Connersville, Ind.

MCNALLY-PITTSBURG MFG. CORP., Pittsburg, Kan., announces that Charles H. J. Patterson, director in charge of engineering, has left by air on an extensive trip to London and the Continent in the interest of coal-preparation equipment and processes of the company.

ELECTRIC STORAGE BATTERY CO., Philadelphia, announces that William Van C. Brandt has resumed his former position as manager of Exide motive power sales after serving in the Navy during the war.

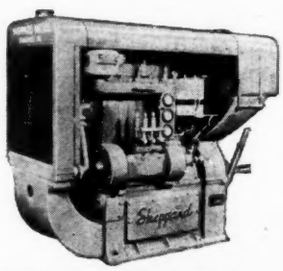
GOODYEAR TIRE & RUBBER CO. announces that William H. Summers, former Washington (D. C.) manager for the me-

WHERE LIGHTS BURN AND WHEELS TURN...

DIESEL'S the Power... *Sheppard's* the Diesel!

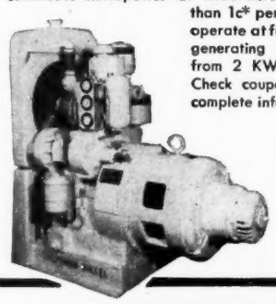
When power costs become an important item of operating expense, it's time to investigate the economy of a Diesel engine.

Sheppard Diesels have *proved* their economy of operation by reducing power costs in hundreds of installations... *frequently as much as 65%!* If *your* answer to the rising cost of labor and materials is the reduction of power bills—remember, *Diesel's the power . . . Sheppard's the Diesel!*



Model 6A-1 3-cylinder Sheppard Diesel power unit develops 25 continuous horsepower at 1200 R.P.M. Delivered complete ...ready to run...including power take-off and clutch. Costs about 96c* to operate at full load for an 8-hour day. Other models ranging from 3¾ H.P. to 56 H.P. The coupon below will bring complete information on the power unit suited to your requirements.

Sheppard 5 KW generating set is powered by a Model 7 1-cylinder Sheppard Diesel developing 8 continuous horsepower at 1200 R.P.M. Costs less than 1c* per KW hour to operate at full load. Other generating sets ranging from 2 KW to 36 KW. Check coupon below for complete information.



*Using 8c per gal. fuel oil

R. H. SHEPPARD COMPANY, INC.
11 MIDDLE ST., HANOVER, PA.

Forward complete information on Sheppard Diesel ——Power Units ——Generating Sets.

*Name*_____

*Address*_____

*Power Unit H.P.*____ *Generator Capacity*____

Westinghouse Hydraulic Brakes



1+1=2?

The arithmetic's right on the **Power**... but how about the **Braking**?

It's a matter of simple arithmetic that putting mine locomotives in tandem will let you start and haul longer, heavier trips. But have you thought what happens when you want to stop?

The motorman just doesn't have enough hands to apply manual brakes on both locomotives at once. He has to piece-out the braking power by motor bucking. This may mean split pinions, broken axles and armature caps, damage to coils and insulation, and burned contact tips and fingers, as your repair sheets will probably tell you.

Give the motorman a brake, and you'll stop this needless waste. Westinghouse Hydraulic Brakes operate at the touch of a lever, give graduated pressures merely by the positioning of the valve handle, and apply the brakes speedily and uniformly on both units. Higher top and average speeds are possible, because of the better control; cars can be spotted more accurately; and users report that the saving in maintenance alone soon pays for the equipment.

Westinghouse Hydraulic Brakes can be installed in available space when the locomotives are in your shop for overhaul. Ask for a reprint, which reports the experience of one user.

WESTINGHOUSE AIR BRAKE COMPANY
INDUSTRIAL DIVISION
WILMERDING, PA.



The Improved Electrode

for manganese steel equipment!

INSUFFICIENT manganese often causes brittleness in manganese weld deposits. If rods are drawn in manufacture, manganese must be limited because of work-hardening. A slight excess of manganese makes drawing impossible. Drawn rods are therefore necessarily limited to a barely sufficient supply of manganese, with risk of weld deposits falling below the 11% minimum.



Coated Stoody Manganese electrodes overcome skimpy manganese content. Since the electrodes are made by tightly rolling the alloying elements in mild steel tubes, a greater percentage of manganese can be included, allowing for burn-out loss with a high margin of safety. Thus, you're assured of more than the minimum alloy content to obtain desirable toughness and wear resistance.

Here Are Other Coated Stoody Manganese Qualities

Fast burn-off rate, low spatter loss, low penetration, high build-up, unusual arc stability with either AC or DC application, easy slag removal.

Try 50 lbs. today! Coated Stoody Manganese costs 40c per lb. in 3/16" and ¼" diameters F.O.B. Whittier or distributor's warehouse. Discounts on quantity purchases. Send for literature.

STOODY COMPANY

1143 W. SLAUSON, WHITTIER, CALIF.

STOODY HARD-FACING ALLOYS
Retard Wear Save Repair

chanical goods division, has been transferred to Cleveland in a similar capacity. He replaces R. E. Britt, who is leaving the company to head the Central States Industrial Supply Co., new Goodyear jobber in Cleveland.

LINK-BELT CO., Chicago, has appointed Arthur J. Olson, heretofore sales engineer for the company at Chicago, as district sales manager at Kansas City, Mo., vice Max Giffey, resigned.

B. F. GOODRICH CO., Akron, Ohio, has named J. E. Gulick as general manager of its tire manufacturing division, vice A. W. Phillips, resigned. Dr. Harlan L. Trumbull, director of synthetic rubber and textile research, will serve as manager of the research and development division, synthetic rubber department, Rubber Reserve Corp., Washington, D. C., on a temporary basis. In Dr. Trumbull's absence, E. A. Wilson will be acting director of synthetic rubber research and Dr. R. A. Crawford, acting director of textile research. Harold S. Meyer has been appointed patent counsel.

LAPLANT-CHOATE MFG. CO., INC., Cedar Rapids, Iowa, has named as executive vice president, general sales manager and member of the board of directors E. R. Galvin, formerly president of the Tyson Bearing Corp. S. L. Myers, who has been vice president and general sales manager during the last year, has been made vice president and export sales manager. Jay M. Fetters, former export manager, becomes manager of foreign development.

RELIANCE ELECTRIC & ENGINEERING CO., 1088 Ivanhoe Road, Cleveland, has appointed Charles R. Newpher, until recently sales engineer in the Cleveland district office, as production manager of the Ivanhoe Division. Frank A. Yusek, assistant superintendent, has been made factory superintendent of the same division. Edward E. Helm, general sales manager, has been elected as sales vice president.

INTERNATIONAL HARVESTER CO., Chicago, has established separate motor-truck branches at San Antonio and Houston, Texas. T. R. Moulder, formerly assistant manager in charge of motor trucks, has been named manager of the new San Antonio branch. C. T. Helin has been advanced from assistant manager in charge of motor trucks to manager of the new Houston branch. E. M. Moore, who has been retail motor truck manager, has been appointed assistant manager of the Houston branch. M. J. Gowan, previously assistant manager at the Cincinnati motor-truck branch, has been made manager of the Richmond (Va.) motor-truck branch. L. C. Carroll, until recently retail motor-truck manager at Columbus, Ohio, replaces Mr. Gowen as assistant manager at Cincinnati. C. V. Ellis, assistant manager of the Topeka branch, has been transferred to the Kansas City motor-truck branch in the same capacity. The company had an informal preview opening of the new Melrose Park works Jan. 29 during the Associated Equipment Distributors' convention at the Edgewater Beach Hotel, Chicago.

CONSOLIDATED PRODUCTS CO., INC., 15

ATTENTION

MINE OPERATORS!

If you have rats or mice, and want to be rid of them without the worry that the use of poison involves, send your order at once.

We have prepared a bait that contains red squill, a drug from the Mediterranean which is harmless to humans, cats, or dogs, but has the special qualities that mean *DEATH TO THESE RODENTS.*

Our R. C. Baits, baked in cookie form, are readily eaten by rats and mice, and have been used successfully with great satisfaction. All you do is scatter our R.C. Baits in infested areas.

No. A 1501— 100 baits—$4.00
No. A 1502— 250 baits— 7.50
No. A 1503— 500 baits—12.50
No. A 1504—1000 baits—20.00

"It's worth the price because it does the work without danger to human life."

Your check, or purchase order, will assure you prompt delivery. We pay all shipping charges except on C.O.D. orders.

RODENT CONTROL CO.

220 Broadway, New York 7, N. Y.

ST. LOUIS SNAPSHOTS



HE GETS

ALL THE BREAKS...

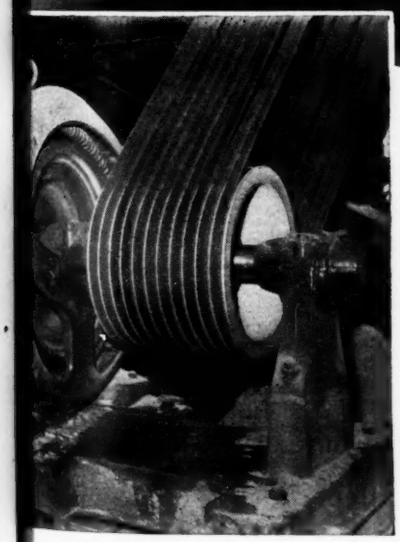
HE HAS A ROOM

AT THE HOTEL

Mayfair

EIGHTH AND ST. CHARLES





The Rippling Muscles of MANHATTAN'S Homocord CONVEYOR BELTS take a terrific pounding and come back for more . . .

and more, and more, until you wonder how any belt can take so much. But it's the Homocord STRENGTH MEMBER infused and protected with FLEXLASTICS that makes this belt pay so well. Stout cords of chosen quality encased in Flexlastics are engineered to roll with the impact like good boxers—and to rebound to every shock . . . It's an engineered belt from core to cover, designed only for conveying and made only by Manhattan.

Condor WHIPCORD V-BELTS

on pumps, shaker screens, coal crushers, washers, fans and other equipment run longer, because they are balanced better. 8 important features are embodied in every Condor V-Belt. Available also with Oil-Proof and Non-Spark features. See Bulletin 6868-B.

Conveyor and Elevator Belts
Transmission Belts
V-Belts
Air, Water, Steam Hose
Fire Hose
Dusting Hose
Suction Hose
Oil Spray Hose
Flexible Rubber Pipe

MANHATTAN
Condor PRODUCTS
for the Coal Industry

Rubber-Lined Pipe
Chute and Launder Lining
Packing and Tubing
Oilless Bearings
Vibration Dampeners
Mine Trolley Wire Guards
Reel Flanges
Brake Blocks and Lining, Clutch Facings
Molded Mine Specialties

RAYBESTOS-MANHATTAN, INC.

MANHATTAN RUBBER DIVISION

EXECUTIVE OFFICES AND FACTORIES PASSAIC, NEW JERSEY

A HOOK *that* CAN'T LOSE ITS LOAD



The newly-designed latch (with stainless steel spring) gives Laughlin's unique Safety Hook a 25%-40% wider throat opening.

Don't chance accidents up above. Laughlin's Safety Hook keeps loads under control even if jolted in mid-air.

They are made of drop-forged steel, heat-treated. They're rugged. Get the details on these hooks with the improved type of latch.

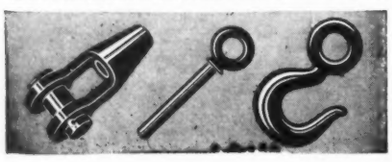
OTHER LAUGHLIN HOOKS

Laughlin offers the most complete line of hooks, including grab hooks, hoist hooks, cargo hooks and other types, all heat-treated, drop-forged and weldless.

Distributed through mill, mine and oil field supply houses. For catalog, write Dept. **6,** The Thomas Laughlin Company, Portland 6, Me.

LAUGHLIN

THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS



Park Row, New York 7, N. Y., dealer in used crushing, chemical and process machinery, reports that Lieut. B. W. Ross, who was with the 69th Division when it made contact with the Russian Army in Germany, serving 3½ years in the U. S. Army, has returned to his duties as sales engineer. Corp. James J. Flannery, who served for three years in the anti-aircraft service in the south Pacific, is now at Tilton Hospital, Fort Dix, N. J., and expects, upon his release, to return to his duties on the sales staff of the company.

MINE SAFETY APPLIANCES CO., Pittsburgh, Pa., has elected as directors William A. Seifert and A. C. Wallerstedt.

WYANDOTTE CHEMICAL CORP., Wyndotte, Mich., announces that L. D. Dodson, manager of its department of public business, now also heads the company's calcium chloride sales, vice Jerome H. Remick Jr., who has joined the sales staff of E. & F. King & Co., Boston.

BEMIS BROS. BAG CO., St. Louis 2, has elected as vice presidents H. V. Howes, director of sales, St. Louis; H. P. Claussen, director, cotton department, Boston; and Judson Bemis, manager, Bemis plant, Minneapolis. T. W. Little, an executive in the burlap importing department, Boston, has been elected treasurer.

AMERICAN CAR & FOUNDRY CO., 30 Church St., New York 8, has appointed D. P. Samson as manager of foundry sales, with headquarters in New York. He succeeds G. A. England, who has been transferred to the operating division of the foundries, located at St. Louis.

GREAT AMERICAN INDUSTRIES, INC., has appointed Albert A. Frank as vice president, who also has been named general manager of Ward LaFrance Truck Division, Elmira, N. Y. A. Ward LaFrance, founder of the company, has announced his retirement from active management of the division, but will remain as vice president of Great American Industries, Inc., and a member of the board of directors. E. M. Hoefle has been named as general sales manager; C. W. Wiley, domestic sales manager; R. L. Harmon, export sales manager; N. G. Bjorck, chief engineer; R. L. Moody, factory manager; and R. M. Bingham, production superintendent.

OKONITE CO., Passaic, N. J., on March 1 moves its Cleveland (Ohio) office from the Cleveland Railroad Building to Room 625, Engineers Building. F. J. Dahleiden continues in charge of the office, which he has managed since its establishment in 1939.

AMERICAN CHAIN & CABLE CO., Bridgeport, Conn., has elected Wilmot F. Wheeler as president, succeeding the late William T. Morris. Mr. Wheeler has been with the company since 1916, was elected a director in 1919, treasurer in 1920 and executive vice president in 1936. Cyrus F. Johns has been elected executive vice president. Stanley Mann has been elected treasurer.

M. W. HEINRITZ, vice president in charge of the Storage Battery Division of Philco Corp., has been appointed to membership



TRAMP IRON *INSURANCE*

DETECT **tramp iron in coal. Dings Detectors signal the presence of iron and steel and will stop a belt so the metal may be removed. Detects the smallest objects over the entire belt width.**

Write for data on Dings Detectors and High Intensity Magnetic Separators.

Dings Magnetic Separator Co.

506 E. Smith St. — Milwaukee 7, Wis.

durable!

Galvanized, drop-forged steel!



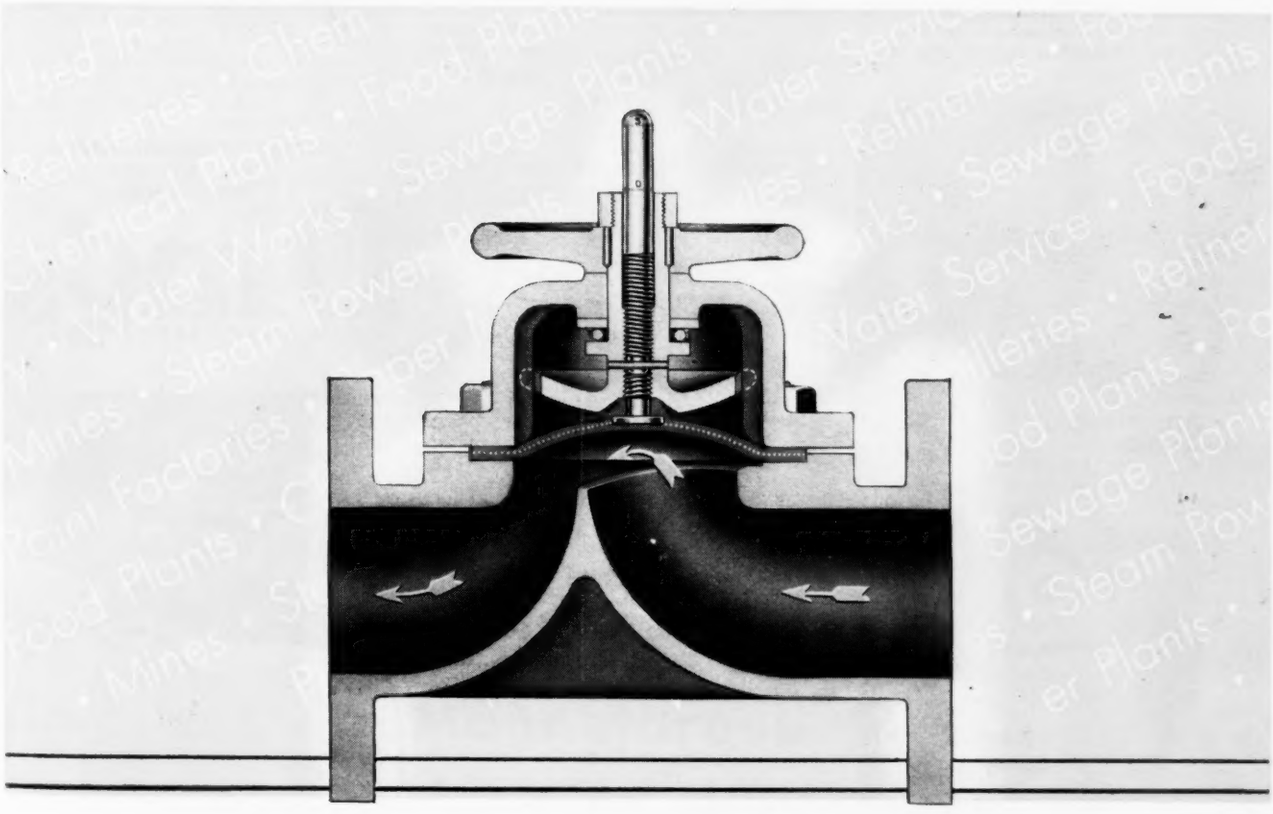
Mfd. by American Hoist & Derrick Co., St. Paul.

CROSBY CLIPS



NOW...A VALVE THAT LAUGHS AT CORROSIVES AND ABRASIVES

...and cannot LEAK, "FREEZE" or JAM!



McAlear No. M-1455 Diaphragm Valve

★ *Pressures, Vacuum to 150 lbs.* ★ *Temperatures to 150° F.* ★ *Sizes ½" to 6".*

- Applicable for air and water lines and special services.
- Used in *every* industry that handles corrosive or abrasive fluids.
- Diaphragm separates mechanism *completely* from fluids handled.
- Shut-off positive—even with solids trapped on seat.
- Closure not dependent on metal-to-metal contact.
- Cannot leak in any position.
- Requires no re-packing.
- Requires no re-seating.
- Diaphragm replaceable with valve in line.
- Special pressure operated types for automatic or pilot control.

FOR BULLETIN giving complete data, write McAlear Manufacturing Company, Automatic Control Division of Climax Industries, 1931 S. Western Ave., Chicago 8, Illinois.

CLIMAX INDUSTRIES

McALEAR

PRESSURE · FLOW · LIQUID LEVEL TEMPERATURE

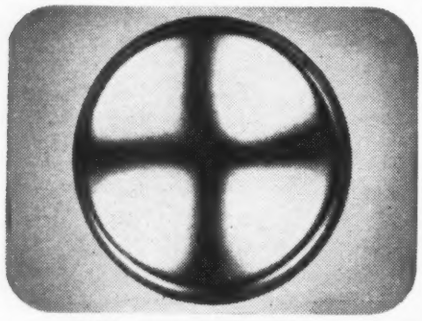
controls

for STEAM, WATER, AIR, OIL-GAS

THE *Safest* EYES WEAR WILLSON SAFETY SPECTACLES



• Accurate fit for every worker—whatever his type of face—is easily possible with Willson's 20 sizes. Remember, correct fit is necessary for maximum safety. For day-long comfort, too.



• SUPER-TOUGH* lenses ward off impact hazards. Each lens is thoroughly tested. Examples: Polariscope test for uniformity of heat treatment; Federal drop-ball test for impact resistance.



• Choose from two styles. "A", without sideshields, "AS", with sideshields, (plastic, Sonite, leather, or wire screen). For glare protection, too, specify lenses in Willsonite green.

WILLSON 75 YEARS

For help with your eye-protection problems, get in touch with your Willson distributor or write direct to Willson Products, Inc.

*T. M. Reg. U. S. Pat. Off.

GOGGLES • RESPIRATORS • GAS MASKS • HELMETS

DOUBLE WILLSON PRODUCTS INCORPORATED

Established 1870

239 WASHINGTON STREET READING, PA., U.S.A.

on the Electric Storage Battery Industry Advisory Committee of the Office of Price Administration.

IRON & STEEL PRODUCTS, INC., Chicago, has appointed J. R. Lawrence, as representative in the Southwest, with headquarters at Room 702, Ritz Building, Tulsa, Okla. A commander in the Navy, he recently was released after five years' service.

JONES & LAUGHLIN STEEL CORP. has appointed William F. Getty as assistant to the manager of raw materials. He was with the Weirton Steel Co. for three years before joining Jones & Laughlin in 1936. H. Robert Hughes has been named as assistant chief engineer in charge of raw materials. He joined the engineering department in 1923 at the Aliquippa works.

ELECTRIC PRODUCTS CO., 1725 Clarkstone Road, Cleveland 12, has added Robert H. Ehret to its headquarters sales staff.

IDEAL INDUSTRIES, INC., is the new name adopted by the Ideal Commutator Dresser Co., Sycamore, Ill., which has changed from a partnership to a corporation.

GENERAL CABLE CO., 420 Lexington Ave., New York 17, has appointed Allen D. Pettee as chief electrical engineer.

DURALOY CO., Scottdale, Pa., has appointed Max Miller as sales manager. He formerly was with F. B. Cornell & Associates, Duraloy representative, as sales engineer.

CENTRAL MINE EQUIPMENT CO., St. Louis, has appointed the following as distributors of its products: Austin Powder Co., Cleveland; Buda Co., Harvey, Ill.; Diamond Supply Co., Evansville, Ind.; Dooley Brothers, Peoria, Ill.; Illinois Powder Mfg. Co., St. Louis, Denver and Salt Lake City; Salem Tool Co., Salem, Ohio

CONSOLIDATED DIESEL ELECTRIC CORP. has engaged as supervisor of sales and advertising Stuart E. Halliday, who for the last nine years has been connected with the Novacal Chemical Co. Consolidated moved March 1 to its new plant at 230 East Eighth St., Mount Vernon, N. Y.

PITTSBURGH PLATE GLASS CO. announces that Arthur R. Haley, general manager of its Columbia Cement Division, died Feb. 14 at his Zanesville (Ohio) home following a heart attack. Previously to becoming associated with the firm, Jan. 1, 1941, he had served as president and general manager of the J. P. Loomis Coal & Supply Co.

AMERICAN BRAKE SHOE CO., 230 Park Ave., New York 17, has appointed Roger W. Batchelder as general purchasing agent, vice William T. Kelly Jr., now president of the company's Kellogg Division. Recently discharged, with the rank of colonel, after five years in the Army Air Force, Mr. Batchelder has been with the company since 1933.

UNITED STATES RUBBER CO. announces that Harman A. Everlien, general sales manager of the mechanical goods division, died suddenly Feb. 21 of a cerebral hemorrhage at his home in New York.

PROTECT COAL CLEANING MACHINERY



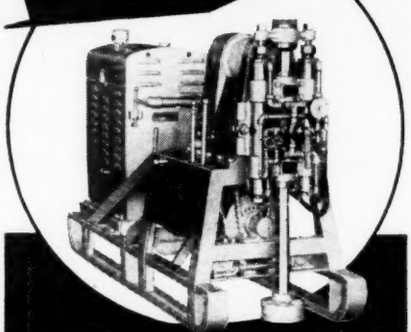
with DINGS MAGNETIC SEPARATORS

• Prolong the life of coal cleaning machinery with Dings High Intensity Magnetic Separators. Protect wet and dry coal preparation equipment permanently from costly tramp iron damage. Pulleys, drums, rectangular suspended magnets or any type unit furnished to fit your specific needs. Write today for helpful literature.

DINGS MAGNETIC SEPARATOR COMPANY
506 E. Smith Street
Milwaukee 7, Wisconsin

Dings HIGH INTENSITY

Diamond Core Drilling CONTRACTORS

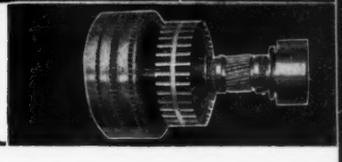


Testing mineral properties with our light gasoline drills. SATISFACTORY COAL CORES GUARANTEED. Ground solidification by our pre-pressure grouting method for shafts. We mine areas, horizontal holes for drainage. Electric drills for inside mine drilling.

MOTT CORE DRILLING CO.
HUNTINGTON • WEST VIRGINIA



Digging With a Magnetorque Bite...



No matter how tough the digging or what the material, the bite of P&H's Magnetorque hoist is driving tonnage costs lower than ever before thought possible.

This unit — used for hoisting only — replaces about two thirds of the usual motor generator set. It actually eliminates the hoist generator, its commutation problems, reduces peak power demands to a minimum. It also eliminates the hoist slip clutch, its headaches and high maintenance costs.

Power for hoisting—under operator's control—is transmitted by electro-magnetic forces. A simple AC squirrel cage motor drives the hoist machinery through the Magnetorque unit without sacrifice of speed, control or responsiveness. Lowering is by gravity so the hoist motor never reverses.

Born of P&H's 60-year leadership in applying electrical power to the movement of heavy loads, the Magnetorque unit is another forward step toward more dependable digging at lower cost in all kinds of open pit operations. Write for complete information.

P&H

ELECTRIC SHOVELS

4540 W. National Avenue
Milwaukee 14, Wisconsin

HARNISCHFEGER CORPORATION

EXCAVATORS · ELECTRIC CRANES · ARC WELDERS · P&H · HOISTS · WELDING ELECTRODES · MOTORS

LEADERS IN ELECTRICAL

TAKE YOUR CHOICE

from the 2 types of

DUFF-NORTON MINE ROOF JACKS



STANDARD

DUFF-NORTON MINE ROOF JACK

Strong, safe, quick operating; made in two capacities—8 and 16 tons; heights from 30 to 72 inches, with a raise of 17 inches. Available with variety of head and handle styles.

TAILOR-MADE

DUFF-NORTON MINE ROOF JACK FITTINGS



You buy only the base and screw fittings, cutting your own 2 inch pipe to the height you need. Fittings are quickly and easily attached to pipe columns. Can be used over and over. Two capacities—8 and 16 tons.

Write for bulletins on both types of Duff-Norton Mine Roof Jacks.

THE DUFF-NORTON MANUFACTURING CO.
PITTSBURGH, PA.
Canadian Plant: COATICOOK, QUE
There is a Distributor Near You

Trade Literature

INSTRUMENTS—Bristol Co., Waterbury 91, Conn. Catalog W1800, entitled "Specification Index for Bristol Instruments," contains information on the Bristol line of automatic controlling, recording and indicating instruments and gives hints on how they can be used effectively to save time and money and promote efficient operation.

SHAKER CONVEYORS—Herold Mfg. Co., Inc., Scranton 5, Pa. Bulletin describes and pictures development of Wizard, Bantam and Standard model drives from 1912, emphasizing notable features. Troughs, supports, connections and other accessories also are shown.

INSULATING VARNISHES—John C. Dolph Co., 168 Emmet St., Newark, N. J. Bulletin gives a short history of insulating varnish, outlines principles governing selection of types for various purposes, describes them, and illustrates processes and equipment.

TRACTORS—Caterpillar Tractor Co., Peoria 8, Ill. Bulletin 9092, entitled "Diesels With Endurance," spotlights the durability of "Caterpillar" diesel track-type tractors used in various mining applications. Featuring action pictures, the book portrays endurance marks made by the machines.

PUMPS—Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y. Bulletin 7057 covers design, construction and engineering details of Cameron single-stage general-service pumps. These units, embracing one type out of a number of centrifugal models offered by the company, are said to be suitable for a wide variety of services wherever liquids have to be handled. Designed for capacities to 25,000 g.p.m. against heads up to 300 ft., they are available in several combination of metals.

MINE CARS—American Car & Foundry Co., New York. Bulletin describes and pictures outstanding features of A.C.F. mine cars embodied to insure maximum efficiency.

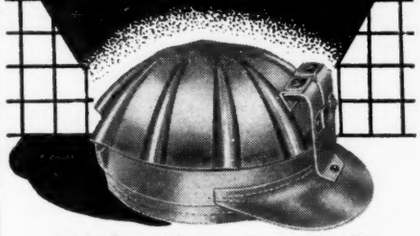
STAINLESS STEEL—Allegheny Ludlum Steel Corp., Brackenridge, Pa. Handbook contains data on 26 stainless types, a 44-column finder table, corrosion resistance to 230 materials, discussions of properties, products, available forms and sizes, and fabrication methods.

ARC-WELDING ACCESSORIES — Hobart Brothers Co., Troy, Ohio. Folder DM-709 displays a complete new line of arc-welding accessories for the welding trade. Items, including many difficult to find, are illustrated and properly identified with catalog numbers for simplification in ordering. Vest-pocket Folder DM-710 covers arc-welding electrodes, giving descriptions, applications, current, physical properties of deposited metal, length and sizes.

HYDRAULIC CYLINDERS—Logansport Machine Co., Inc., Logansport, Ind. Catalog announces new standard "Rotocast" line of hydraulic cylinders. It is said that unusual dimensional stability of the bore results from close-grained gray-iron centrifugal castings, permitting exceptionally smooth bores, assuring uniform power flow with minimum

PORTABLE "Cool Cap" and Safety Equipment

HELP AVOID MANPOWER LOSS



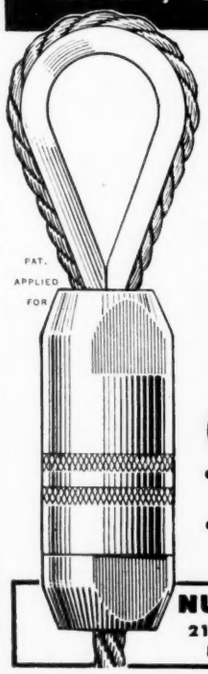
Write for catalog on our complete line of Safety Equipment, including Safety Hats, Miners' Belts, Safety Shoes and Boots, Powder Bags, Haulage Safety Devices, Goggles and Respirators.

PORTABLE SAFETY DIVISION
PORTABLE PRODUCTS CORPORATION
420 Blvd. of the Allies, Pittsburgh 19, Pa.

NEW! BETTER!

Cabl-ox

THE NEW WIRE ROPE CLAMP That Really Holds the Line!



CABL-OX clamps work on a brand new wedging principle. Holding power increases with the load and exceeds tensile strength of rope used. Does not crush and weaken rope like old style U-clips. Assembly is fast, neat . . . saves breakdowns, equipment, injuries and expense. Can be used over and over. Cadmium plated.

Cabl-ox

- Made in all sizes from 1/16" to 3/4". For all wire rope applications.
- Ask your distributor or write for illustrated folder and prices.

NUNN MFG. CO.
2125 Dewey Avenue
Evanston, Illinois



Hammond's

Safety Equipment

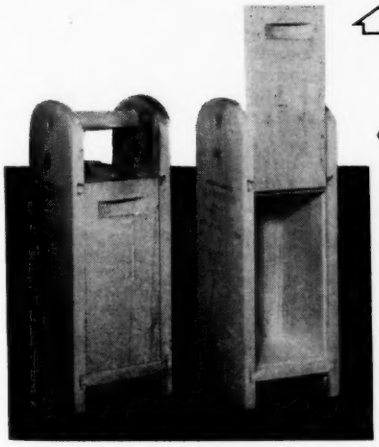
for efficient handling of Explosives

Here is your first view of the HAMMOND Safety Shot Firing Unit . . . a design innovation that insures absolute safety and 100% effectiveness over long periods of use. *A test unit was fired 2,146 times before battery change was required.* Points of greatest importance and advantage to you include these:

1. **Unit features all wood construction, impregnated with "Arboneeld" and parrafin, making the case moisture and warp resistant.**
2. **Electric contact is made inside the case through a protective slide.**
3. **Unit employs ordinary flashlight batteries for economical maintenance . . . batteries easily replaced through bottom of case. Energized contact cannot be made at bottom of case.**
4. **Shot firing units available up to maximum permissible voltage in single shot blasting units.**
5. **The unit as designed by HAMMOND meets all inspection standards (Approved by U. S. Bureau of Mines, April 2, 1945)**
6. **Safety is an absolute certainty with this battery unit. Everything has been done to eliminate accidental energized contacts, damage from moisture and short circuits and stray current seepage.**

The HAMMOND Shot Firing Unit is, as pictured, as compact and free from unnecessary details as technically possible. It is economical to maintain and easy to operate . . . from every standpoint a superior product—one that every mine should be equipped with. Write for more detailed information today. Price per unit complete with battery $3.90.

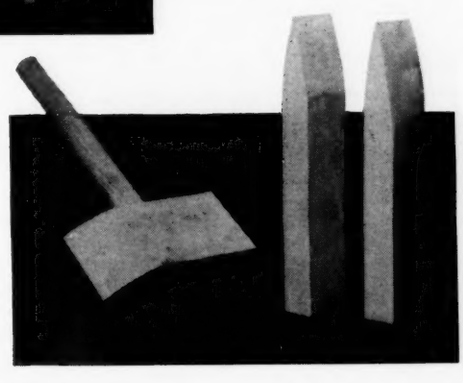




Wood tamping poles made of hardwoods lengths to 12 ft. 1 inch diameter 5c per lineal ft., 1-¼" diameter 6c per lineal foot and 1½" at 8c per lineal ft.

Explosive Boxes, made entirely of wood having no metal parts, tongue-grooved and dovetailed construction with automatic lock using a rubber band for a spring, treated with paraffin to make moisture resistant. "Approved by Penna. Dept. of Mines". Sizes as listed based on 1-¼" x 8" sticks.

No. 9 Powder box.....	1.12
No. 12 Powder box.....	1.27
No. 16 Powder box.....	1.43
No. 20 Powder box.....	1.58
No. 36 Powder box.....	2.94
No. 72 Powder box.....	4.23
No. 8 Detonator box... sizes 2x2½x8" inside	1.01
No. 6 Detonator box... sizes 2½x3x6" inside	1.01



Wooden Mallet and wedge sets for opening explosive cases made of hardwoods, mallet doweled to prevent splitting

Price $4.50 per set

J.V. Hammond Co.

Spangler, Penna.

Manufacturers of Tamping Poles, Shot Firing Units, Wooden Mallet and Wedge Sets, Explosive Boxes, Trolley Poles, Sounding Sticks, Mine Rollers, Insulation Blocks and Brake Blocks.

friction and leakage. Also are given complete specifications and engineering data on the various available cylinder types, suggested methods of application, and helpful information for designing hydraulic circuits.

SAFETY SHOES—Hy-Test Division, International Shoe Co., St. Louis 3. Series of twelve forceful safety messages prepared to impress workers with the danger and costliness of accidents supplied in size convenient to slip into pay envelopes.

CASTINGS—Meehanite Corp., Pershing Square Building, New Rochelle, N. Y. Motion picture entitled "Meehanite Means Better Castings," running 29 minutes, gives a comprehensive story of the engineering characteristics of Meehanite castings and their industrial applications.

SYNTHETIC RUBBER—Raybestos-Manhattan Rubber Division, Passaic, N. J. Bulletin points out that Flexlastics, which are said to be more than rubber, are highly developed compounds of suitable natural and synthetic rubbers, age-resisting chemicals, pigments, filters, etc., scientifically controlled through manufacturing processes to produce a balanced, coordinated and homogeneous unit. Describing what Flexlastics are, the folder is well illustrated with pictures of typical installations, testing equipment and principal products.

HIGH-VOLTAGE SWITCHES — Delta-Star Electric Co., 2400 Block Fulton St., Chicago 12. Publication 4601 pictures and describes the improved MB-39 pole top and outdoor substation multi-pole capacities in ratings from 7.5 to 161 kv and ampere capacities from 400 to 1,200, either manual or motor operated. Close-up pictures show the "twist-like-a-wrist" blade-movement mechanism, and contacts at both blade ends without the use of shunts or braids. Dimensions are given for switches with center-bolt, 3- and 5-in. bolt centers cap and pin insulators. Post-type insulators also are furnished.

LEATHER BELTING—E. F. Houghton & Co., 303 West Lehigh Ave., Philadelphia 33. Wall chart, 23x36 in. suitable for hanging in maintenance room, covers all phases of care of leather belting.

STAINLESS STEEL CASTINGS—Allegheny Ludlum Steel Corp., Brackenridge, Pa. New blue sheets of reference data on Allegheny steel castings, stainless Types 347, 321 and 416 and Ludlum 609 shock-resisting steel for tools and machine parts contain reference data certified by the company's technical staff and prepared from carefully checked laboratory and service tests. Physical properties, corrosion and oxidation resistance, effects of elevated temperature, and heat-treating procedures and results are given in condensed form.

INDUSTRIAL LININGS—Industrial Lining Engineers, Inc., Edgeworth, Pa. Bulletin points out the importance of lining equipment in meeting corrosion problems, citing as protection for mining equipment vinyl or rubberlike plastics.

VALVES—Manning, Maxwell & Moore, Bridgeport, Conn., and Boston, Mass. Catalog states that something new has been added to the Hancock valve line, the new Weldvalve in gate, globe and angle designs, 600- through 2,500-lb. standards. The new designs are said to eliminate or neutralize valve joints, seat-ring joints, bonnet joints and improve packing-gland joints. The manufacturer states that these new units effect major savings in weight (30 to 60 percent), space, parts, replacements, maintenance and lagging expense, besides giving precision and accurate alignment.

EMERGENCY PACK-TYPE CUTTING OUTFIT—Victor Equipment Co., 844-54 Folsom St., San Francisco. Bulletin Form 69 details the advantages of these cutting outfits to rescue squads following accidents, fires and wrecks.

TECHNICAL BOOKS—Chemical Publishing Co., Inc., 26 Court St., Brooklyn 2, N. Y. Catalog includes the latest books on chemistry, physics, science, technology, medicine, foods, formularies, drugs and cosmetics, engineering, metals, technical dictionaries, building construction, etc. Date of publication of each book is given, as well as price, number of pages, detailed descriptions and full table of contents.

FABRICATED STEEL PRODUCTS FOR THE MINING PROPERTY—Armco Drainage & Metal Products Inc., 1720 Armco Ave., Middletown, Ohio. Booklet describes tunnel liner plates for slope entries, haulways, escapeways, air shafts, substations and overcasts; standard Steelox buildings for rectifier structures; pump, fan, tool and lamp houses, cap and powder storage, machine shops, garages, locker and washrooms, office buildings and other purposes, in addition to welded steel pipe and fittings, quick-coupling portable pipe, corrugated arches, corrugated pipe, perforated corrugated pipe, retaining walls, guard rail, sheeting, bridge deck and smoke jacks.

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Authoritative Valuations, and Reports of Mining Properties Equipment and Operation.
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An EXTRA TON in Every Load



. . . that's the 10-Year Record of this Republic High Strength Steel truck body

This 12-ton dump truck, owned and operated by Holland Coal Company, Chicago, ably demonstrates the profitable advantages which Republic High Strength Steels offer the fleet operator.

Truck tare weight was reduced one ton . . . payload was increased by an equal amount—without adding strain to the axle or other moving parts. Averaging 8 to 10 trips per day, the truck now carries approximately *two full loads per day more* than was possible with ordinary steel bodies.

Due to the highly corrosive nature of the treated coal, previous truck bodies lasted only four or five years. Yet, AFTER MORE THAN 10 YEARS, this Republic High Strength Steel body still is in active service.

Republic—pioneer in high strength steel development—now offers you three different high strength steels: Republic ALDECOR, Republic COR-TEN and Republic DOUBLE STRENGTH in bars, plates, sheets and strip. While all are similar in physical properties, certain differences in forming and welding characteristics may make one, more than the others, best suited to meet your requirements. For further details, write to:

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, New York

Republic
HIGH STRENGTH STEELS
ALDECOR • COR-TEN • DOUBLE STRENGTH

Other Republic Products include Carbon, Alloy and Stainless Steels—Sheets—Plates—Pipe—Bars—Wire—Bolts, Nuts and Rivets

MINE OPERATING OFFICIALS STUDY OF METHODS FOR

Here are the results of just a few short-cuts, time-savers and cost-reducing ideas already "uncovered" in the study being done for the Mining Efficiency Number. Explanations of these and hundreds of others will make this the most practical down-to-earth book of mining "know-how" COAL AGE has ever produced.

1. At one mine power cost was lowered from 9 cents to 6 cents per ton.
2. Supply inventory was reduced by $10,000 as a result of installing a regular inventorying and record system.
3. 1,000 feet of main line haulage was eliminated by installing a passing track.
4. Tonnage raised at least 10% by underground ditching and dams to establish a single sump.
5. New safety practices reduced lost-time injuries by 60%.
6. New lubricating practice and equipment completely eliminated formerly heavy bearing failures on loaders.
7. A new fan installation shortened air travel 5,000 feet, increasing air volume 30,000 cu. ft. m. using the same hp motor.
8. 15% greater tonnage brought about by revision of mine cars.
9. In less than three years, one mine has eliminated misunderstandings and cut absenteeism by its "every-day labor relations" policies fostering team spirit. Labor unrest greatly reduced.

ACTIVELY JOIN EDITORS IN MINING EFFICIENCY NUMBER

FOR EXAMPLE, FROM A LARGE COAL COMPANY:

"We were pleased to have your Mr. ——— call upon us last Saturday morning. We attempted to give him such information that he requested and might I say to you, should you desire any further information we shall be very pleased to assist you. I think that your publications have been very beneficial to the coal industry at large."

(PRESIDENT)

Scores of visits have already been made by COAL AGE editors at Coal-For-Victory mines to assemble the vitally important facts to be presented in the Mining Efficiency Number in May. Everywhere there has been 100% cooperation on the part of the mine officials in giving the facts concerning the methods which helped them to win their awards. In case after case, they have gone beyond the questions asked. and volunteered other information of extreme importance. COAL AGE deeply appreciates this.

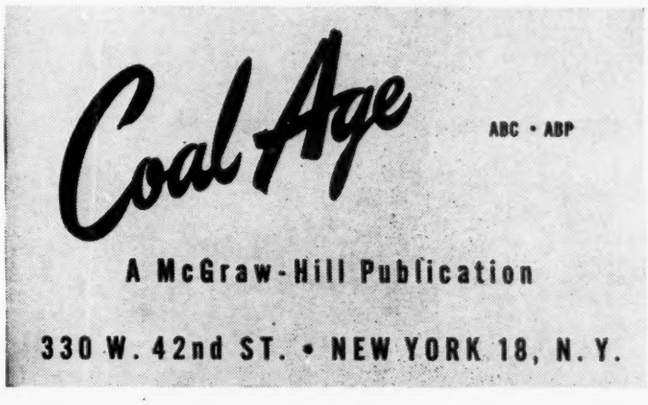
The *entire coal industry* will profit by it. For through this enthusiastic cooperation, and this willingness to tell how operations have been made more efficient, the industry will receive in the Mining Efficiency Number a book of facts and ideas of utmost and lasting value to everyone interested in mining and preparation of coal.

FACTS NOW BEING ANALYZED, CLASSIFIED

There are literally thousands of items, records, facts, figures and ideas coming from this country-wide study. They are being classified as they come in, and are undergoing exhausting analysis.

Methods and equipment which cut costs, increased efficiency and improved the quality of coal for these Coal-For-Victory mines, and can bring similar benefits to hundreds of others. When they go into the Mining Efficiency Number, the whole story will be there — but "boiled down" to where you will find it quick, easy and interesting reading. And there will be pictures, drawings, lay-outs and diagrams aplenty to make every explanation clear.

It is our honest opinion that the Mining Efficiency Number will be the most usable and practical edition COAL AGE has ever given you.



HERE'S A REALLY AUTOMATIC TROUBLE-PROOF GATHERING PUMP

.Made specially for mine de-watering, this Gorman-Rupp centrifugal pump gives you these four chief operating features.—

1—Fully automatic self-prime, and no chance to lose this prime. The entire cycle - stop - start - prime - run - requires no attention—ever!

2—Ability to handle, not only water, but muck or solids of any size or consistency that will enter the intake strainer.

3—Absolute simplicity—only one moving part in pump—and durable, accurately machined parts will give you 24-hour-per-day service.

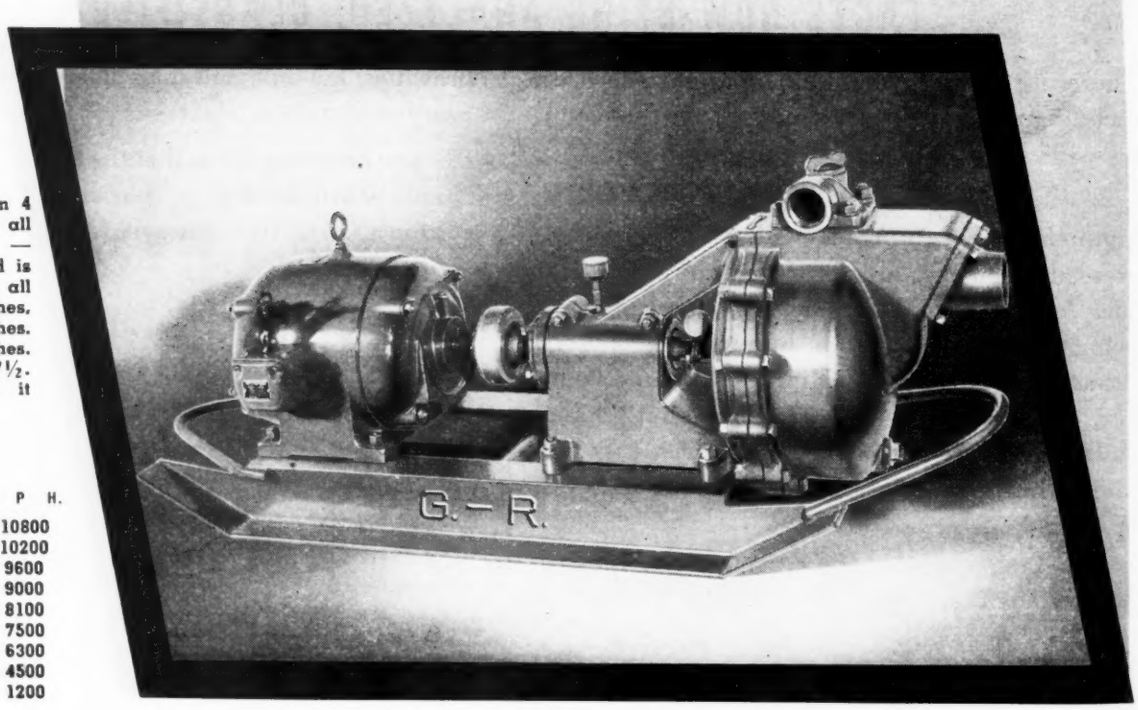
4—All wearing parts are easily and quickly replaced.

Compare their weight, size, cost or operating expense, and you will find Gorman-Rupp pumps to be the most all-around effective mine gathering pump on the market.

GORMAN-RUPP PUMPS — ARMY NAVY — UNSURPASSED FOR PUMPING FAST

THE GORMAN-RUPP COMPANY

MANSFIELD • OHIO



Available in 4 sizes to meet all requirements — Model illustrated is 60-100. Over - all length, 34 inches, width 17½ inches. Height 21¼ inches. H. P., 5 or 7½. Here is what it will do.

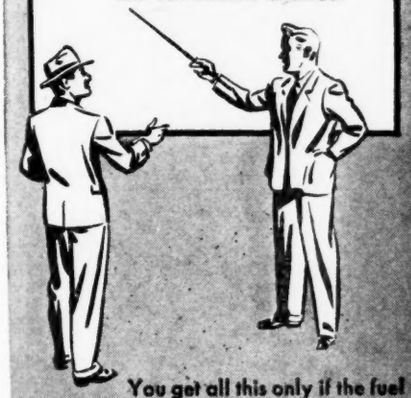
TOTAL HEAD FEET	G. P. H.
20	10800
30	10200
40	9600
50	9000
60	8100
70	7500
80	6300
100	4500
120	1200

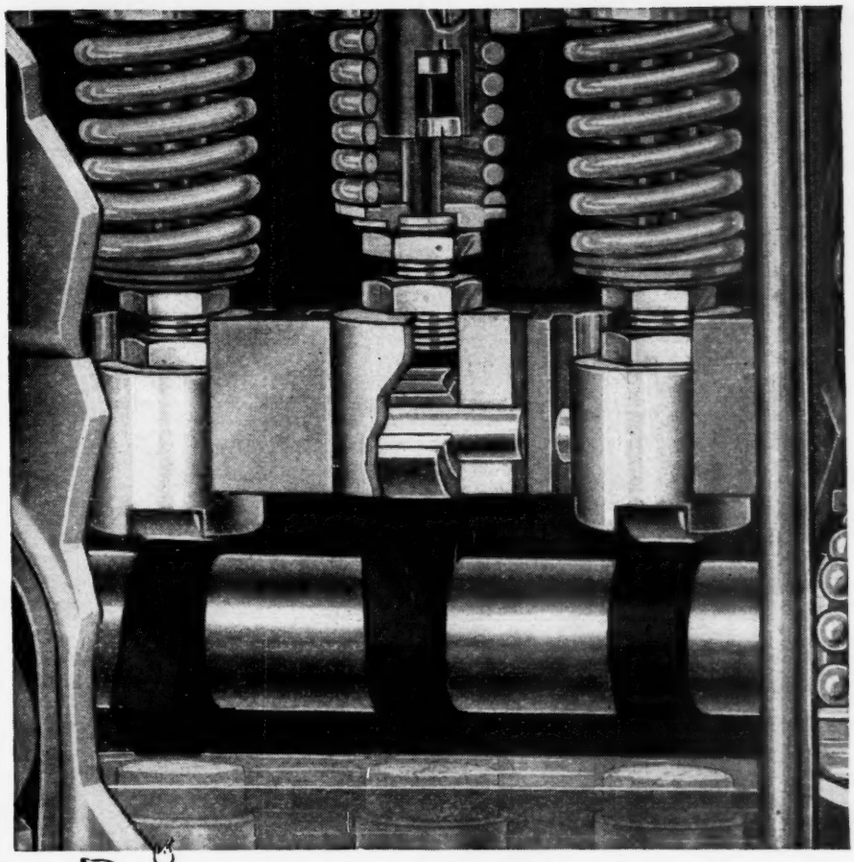
GOOD FUEL INJECTION

Fits the Engine

GOOD FUEL INJECTION PROVIDES:

A. Accurate Metering
B. Precise Timing
C. The Correct Duration
D. A Spray Pattern Tailored to the Combustion Chamber



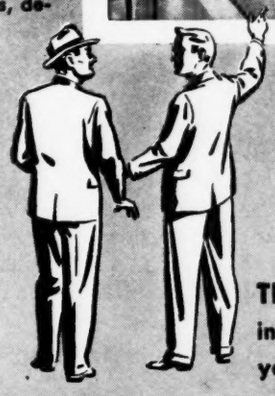


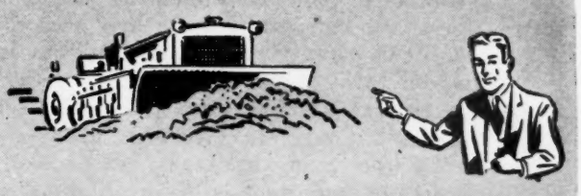
You get all this only if the fuel injection system has been engineered to fit the engine.

There are types of American Bosch injection equipment to suit all types of engines. The final engineering touches that make the equipment really *fit* involve the specially-designed or selected parts such as cams, plungers, delivery valves and nozzles.

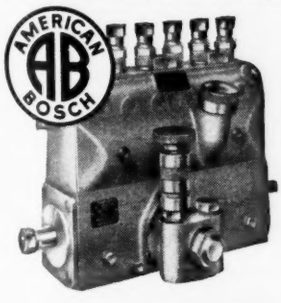
●

THESE CAMS in the fuel pump, for example, are vital. They contribute importantly to control of the rate and duration of injection. They are engineered to co-operate smoothly with other elements of the fuel injection system to produce precisely the type of spray called for by the engine design.





THEY CAN TAKE IT. If your engine has American Bosch injection equipment — the kind that is engineered to fit — you can be sure that it will perform to its very best in giving you economical service under any and all conditions.



AMERICAN BOSCH CORPORATION, SPRINGFIELD 7, MASS.

AMERICAN BOSCH

Diesel Fuel Injection



WE HONOR THE WEARERS OF THIS EMBLEM

Wearers of the service emblem, you have proved to the world that Americans with American-made machines could not be defeated. Many of you have used LIMA cranes, shovels and draglines to build air strips and bridges; to load and unload ships; to remove debris from bombed areas and countless other jobs important in winning the war. You have seen the efficiency of LIMA machines under trying conditions, how their smoothness of operation, ease of control and fast operating speeds step up the tempo of the job. To the veterans, who will continue to serve America in peacetime construction, LIMA offers the same high quality shovels, cranes and draglines which served so well in war. LIMA shovels are made in sizes ranging from 3/4 yard to 5 yards capacity, crane sizes range from 13 tons to 100 tons. Write for bulletins.

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NEWARK, N. J. · DALLAS, TEXAS · MEMPHIS, TENN. · SEATTLE, WASH. · PORTLAND, OREGON
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LIMA

SHOVELS - CRANES - DRAGLINES

Capacities

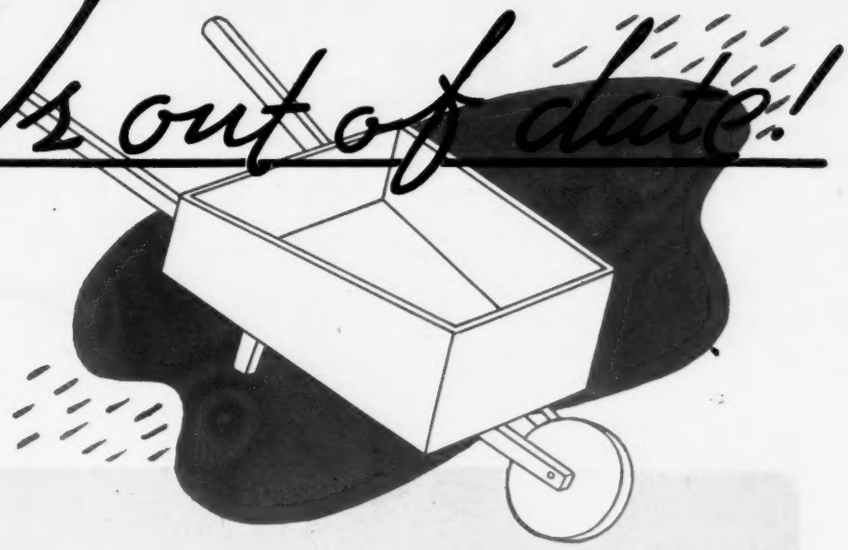
SHOVELS
3/4 Yd. to 5 Yds.

CRANES
13 Tons to 100 Tons

DRAGLINES
Variable

"WHEELBARROW" EFFICIENCY

Is out of date!



CLIFFS Dependable COALS

CCIC

Profit in coal can be assured only by modern efficient selling; reaching ALL of the RIGHT MARKETS for YOUR PARTICULAR COAL. Our far-flung organization covering twenty-six states and the Great Lakes area offers just that efficiency.

THE CLEVELAND-CLIFFS IRON COMPANY

UNION COMMERCE BUILDING • • CLEVELAND 14, OHIO

COSTS GO UP *when* THESE GO OUT



AO SAFETY GOGGLES SAFEGUARD THE EYES OF INDUSTRY

EYES are *expensive* targets, for a single eye injury can cost more than $1000 in compensation and medical care.

Perhaps your plant has never had to pay a four-figure claim. Yet — unless you have an adequate eye protection program — so called minor eye accidents are probably adding materially to your costs. (It is estimated by the Society for the Prevention of Blindness that eye injury costs average *$5.00 per shop worker per year.*)

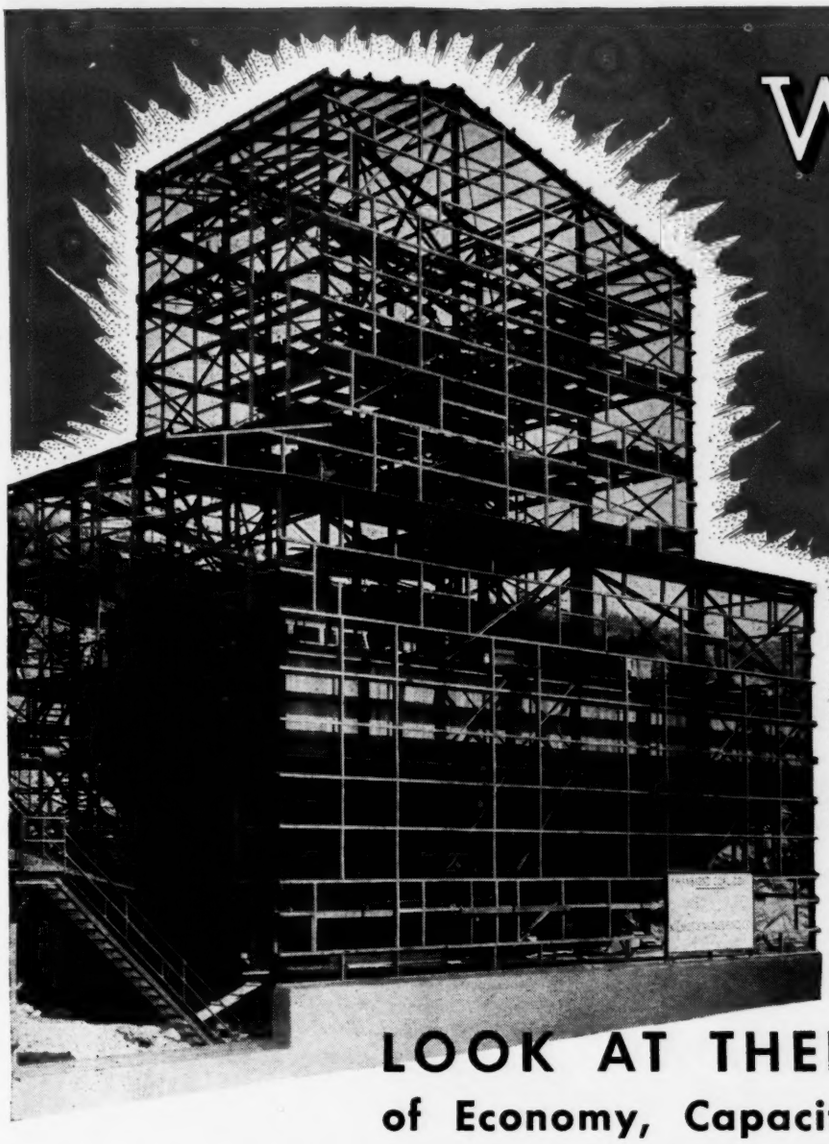
Ninety-eight per cent of eye accidents are preventable — by providing your workers with properly designed safety goggles — at a cost of only about $1.50 per worker. Why not let your nearest MSA Representative help you work out the details for a real eye protection program *now?*

American Optical

COMPANY

SOUTHBRIDGE, MASSACHUSETTS

Safety Division



WILMOT BUILDS *Better* BREAKERS



LOOK AT THEIR RECORDS

of Economy, Capacity and Efficiency

Urgent demands for peak coal production during the war period furnished the best test of a breaker's efficiency. Under that test, Wilmot-built breakers made proud records. Judging them on all four efficiency factors—capacity, economy of operation, quality of product, and coal yield—these preparation plants were stand-outs.

In addition to breakers that were completely designed, erected and equipped by Wilmot, we point to scores of other breakers that were enabled to meet urgent demands by installations of Wilmot preparation equipment. Call on us to participate in your breaker construction program as best serves your purpose. Wilmot know-how will help you build a better breaker.

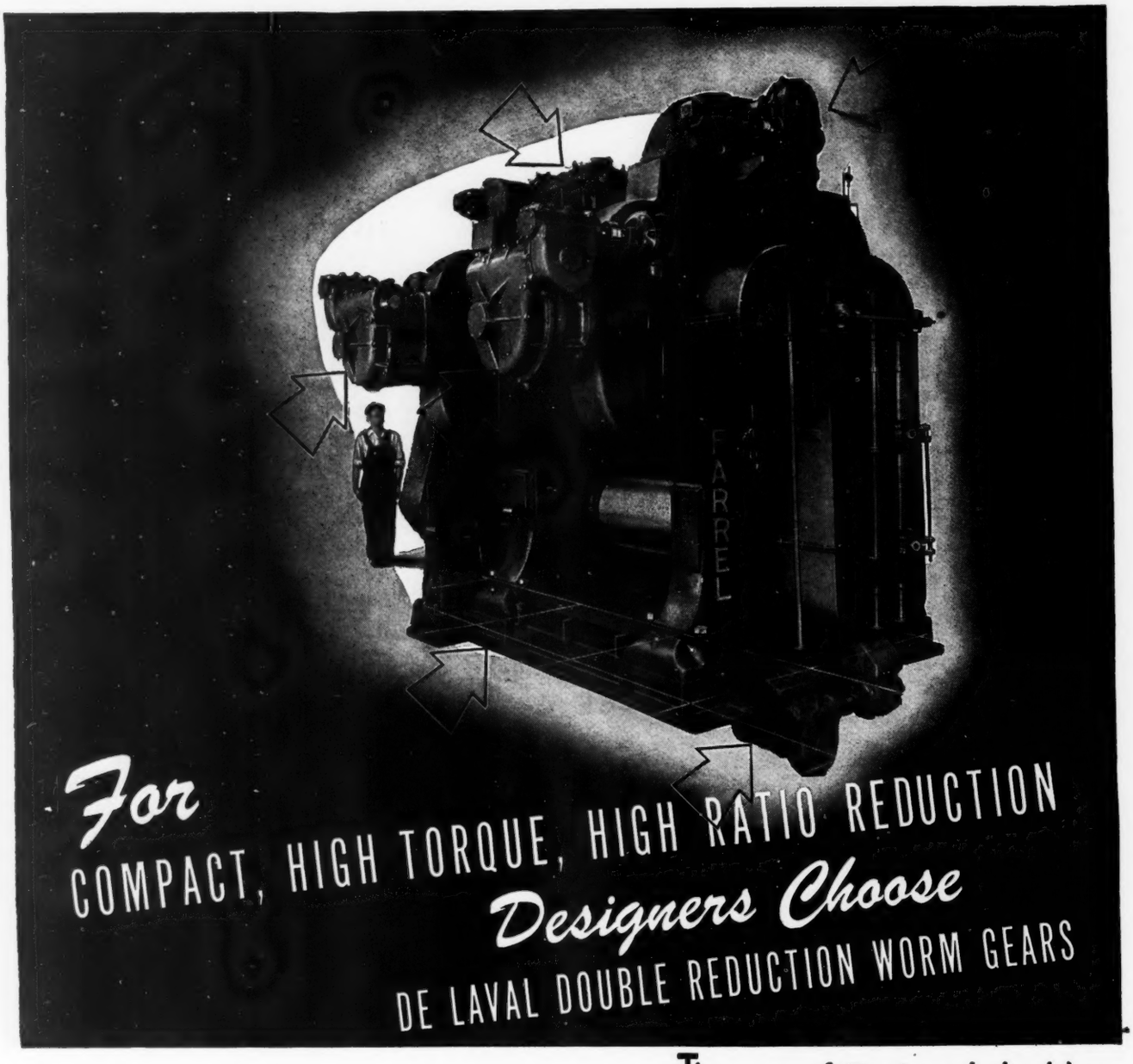


WILMOT ENGINEERING CO.

HAZLETON, PA.
Foundry and Shops:
WHITE HAVEN, PA.

Wilmot Coal Preparation Equipment: Hydrotators • Hydrotator-Classifiers • Hydro-Separators • Simplex Jigs Crushing Rolls • Sizing Shakers • Bucket Elevators • Conveyors • Car Hauls • Keystone Rivetless Chain, etc.

WILMOT BUILDS BETTER BREAKERS



For
COMPACT, HIGH TORQUE, HIGH RATIO REDUCTION
Designers Choose
DE LAVAL DOUBLE REDUCTION WORM GEARS

The use of De Laval double reduction worm gears for operating the screw-downs on this Farrel-Birmingham sheet rubber calender illustrates the extreme compactness of this type of drive for transmitting high torques at high reduction ratios. Each screw-down is adjusted by means of a separate motor and reducer unit, making it possible either to adjust each end of each roll independently or to synchronize the adjustment of both ends in parallel.

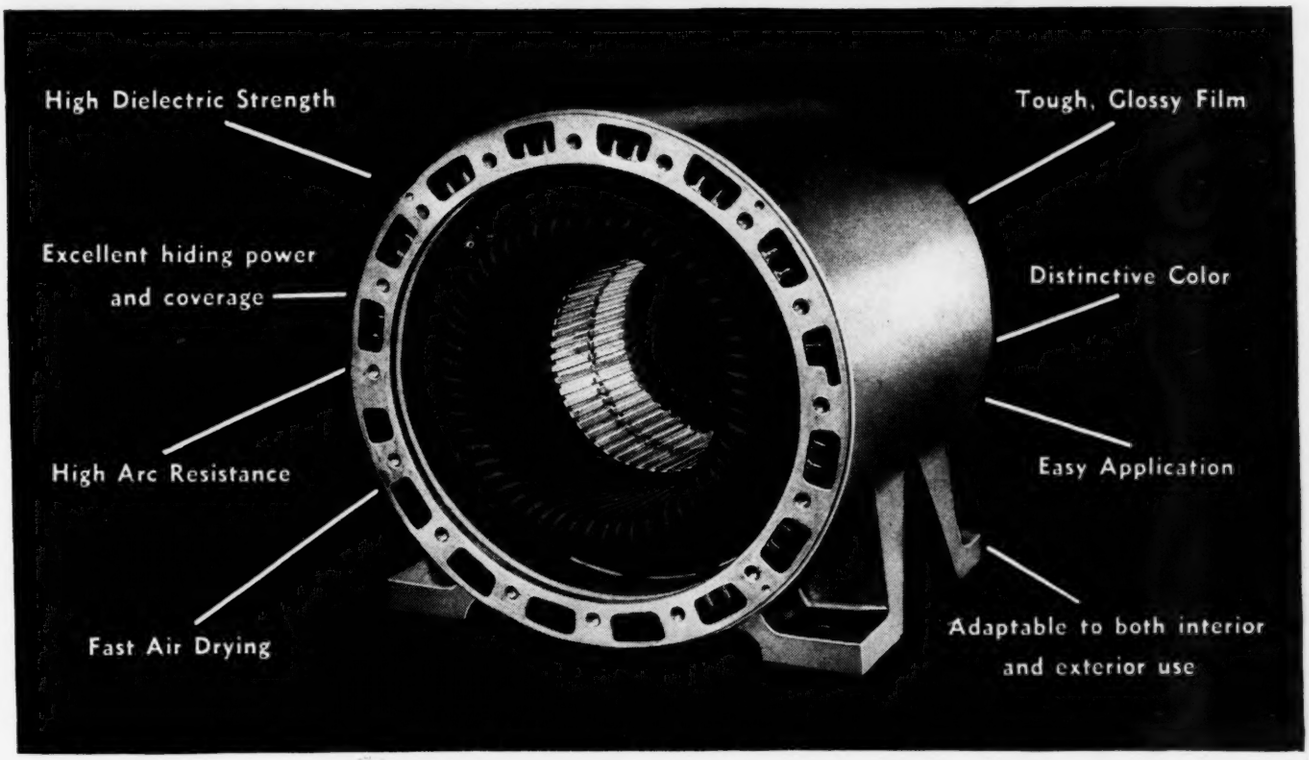
1153

TURBINES • HELICAL GEARS and WORM-GEAR SPEED REDUCERS
CENTRIFUGAL PUMPS • CENTRIFUGAL BLOWERS and COMPRESSORS • IMO OIL PUMPS

WORM GEAR DIVISION
DE LAVAL
STEAM TURBINE COMPANY · TRENTON 2, NEW JERSEY

SALES OFFICES ATLANTA • BOSTON • CHARLOTTE • CHICAGO • CLEVELAND • DENVER DETROIT • HELENA • HONOLULU • HOUSTON KANSAS CITY • LOS ANGELES • MANILA MONTREAL • NEW HAVEN • NEW ORLEANS NEW YORK • PHILADELPHIA • PITTSBURGH ROCHESTER • ST. PAUL • SALT LAKE CITY • SAN FRANCISCO • SEATTLE • TORONTO • TULSA VANCOUVER • WASHINGTON, D. C. • WINNIPEG
And Cities in Central and South America

Protection DOLPH'S #10 RED INSULATOR



Illustration—Stator of Continental Electric Explosion-proof Motor

"WET DIELECTRIC UNCHANGED AFTER 3500 HOURS OF HEAT-AGING AT 275°F."

Yes, * SYNTHITE #10 Red Insulator was actually subjected to this severe test and passed it with "flying colors." SYNTHITE #10 Red Insulator was applied over two coats of clear baking varnish on a brass surface, and HEAT-AGED FOR 3500 HOURS AT 275°F. After this period, the test specimens were immersed in distilled water for 24 hours. The wet dielectric strength of the varnish after this treatment did not vary materially from the wet dielectric determined before the test, and the varnish film was in good condition.

Applied by brush or spraying over prevarnished surfaces, SYNTHITE #10 Red Insulator affords maximum protection against chemical fumes, oil, water, acids and alkalies. In fact, the chemical resistance of SYNTHITE #10 is so great that engineering departments of various industries such as paper mills, refineries, cement plants, copper mines, coal mines, quarries and steel mills, are using this enamel for protection against chemical fumes.

Insulating Dolph's Varnish Specialists

JOHN C. DOLPH COMPANY

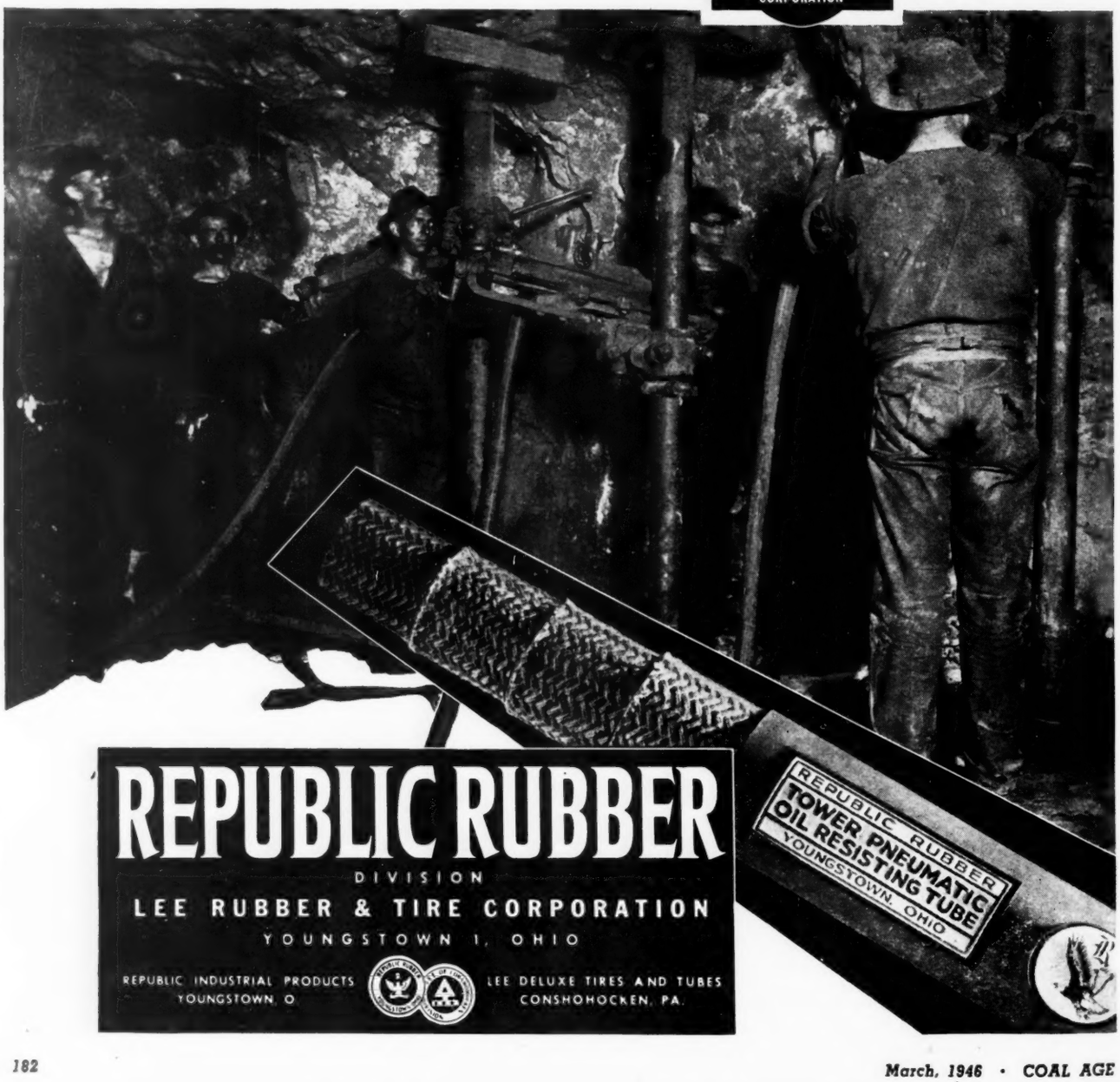
168 EMMETT STREET • NEWARK 5, N. J.,

* Reg. U. S. Pat. Off.

NEW IMPROVEMENTS IN TOWER HELP YOU

SERVICE conditions subject air hose to abuses of all kinds: dragging over sharp, abrasive objects, hot oil from the compressor, high pressures with intermittent strains on the reinforcing body. Republic's Tower Pneumatic Hose has long been classed as top equipment, through its ability to withstand the severest of these conditions. Now, Republic technologists have adapted the best features of selected synthetic rubber for Tower's construction . . . increasing still further the capacity of this well-known hose for long, trouble-free, time-and-money-saving service in mining operations. Consult your Republic Distributor on your next equipment needs.

WE ARE PARTICIPANTS IN THE OWNERSHIP AND OPERATION OF NATIONAL SYNTHETIC RUBBER CORPORATION



REPUBLIC RUBBER

DIVISION

LEE RUBBER & TIRE CORPORATION

YOUNGSTOWN 1, OHIO

REPUBLIC INDUSTRIAL PRODUCTS
YOUNGSTOWN O

LEE DELUXE TIRES AND TUBES
CONSHOHOCKEN, PA.

5 reasons



1. Gears are continuous tooth herringbone —the famous *Gear with a Backbone. Backbone,* the place where the helices meet, provides extra strength and load-carrying capacity. Accurate tooth contour, gradual engagement and oblique lines of contact assure correct tooth action, minimizing wear.
2. Precision ground shafts are designed to provide the rigidity necessary to prevent deflection and keep gears in exact alignment.
3. Roller bearings of adequate size for the job hold the shafts in precise alignment.
4. Heavy section housing holds rotating elements in original accurate alignment. Exterior ribbing at bearing points gives extra protection against deflection.
5. A continuous splash lubrication system provides ample oil supply to gears and bearings. A trough system of oil feed to the bearings provides a surplus flow with fixed regulation for ample supply. End covers and baffles at shafts prevent possibility of oil leakage, or entrance of dust and dirt.

WHY EFFICIENCY STAYS "YOUNG" IN THIS SPEED REDUCER

The power transmission efficiency of a new Farrel speed reducer is 98% to 98.8%. To preserve this original efficiency...to keep it "young" during long, exacting service, Farrel has designed in protection at 5 vital places.

This 5-point protection minimizes wear and assures the continuance of original power transmitting performance for many years of trouble-free operation.

Farrel Speed Reducers are available in a complete range of sizes for any application. Ratios of single reduction units range from 1½:1 to 10:1, double reduction units up to 60:1, and triple reduction units up to 180:1. For complete information write for catalog No. 438.

FARREL
The Gear with a Backbone

FB-279

FARREL-BIRMINGHAM COMPANY, Inc.
344 VULCAN STREET • BUFFALO, N. Y.
Plants: Ansonia, Derby and Stonington, Conn., Buffalo, New York
Sales Offices: Ansonia, Buffalo, New York, Pittsburgh, Akron, Los Angeles, Tulsa, Houston, Charlotte

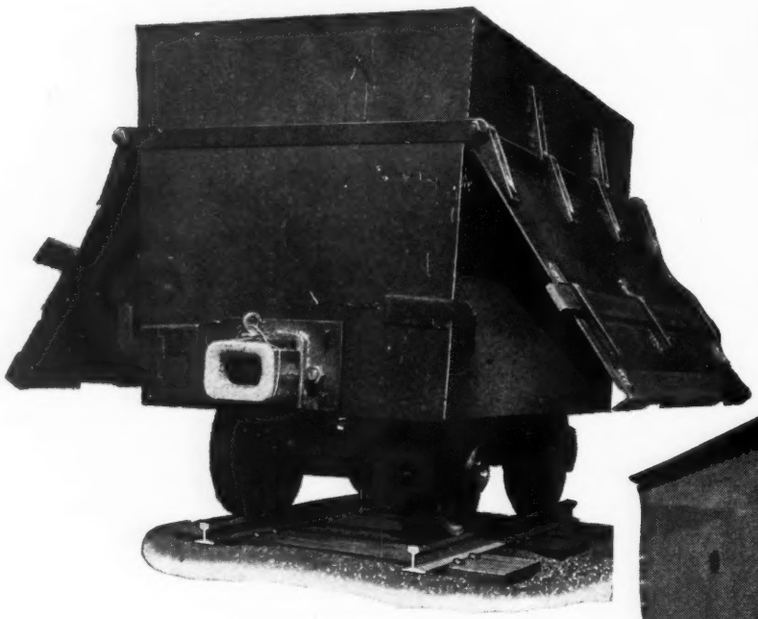
Farrel-Birmingham

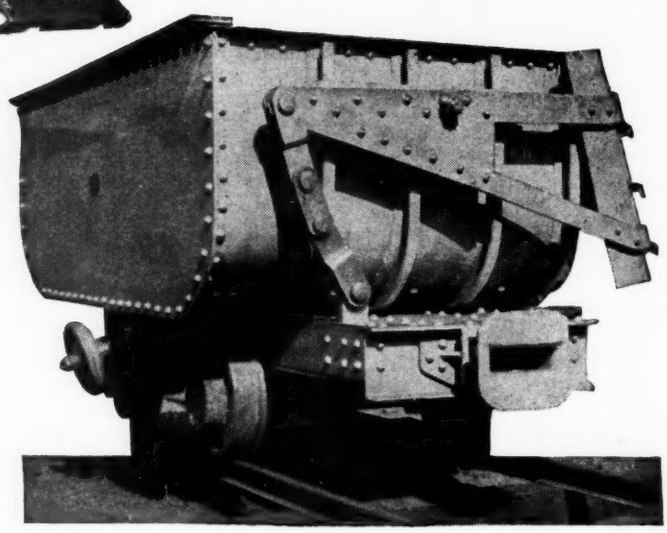
Built for a long life of rugged duty—

time saving

labor saving

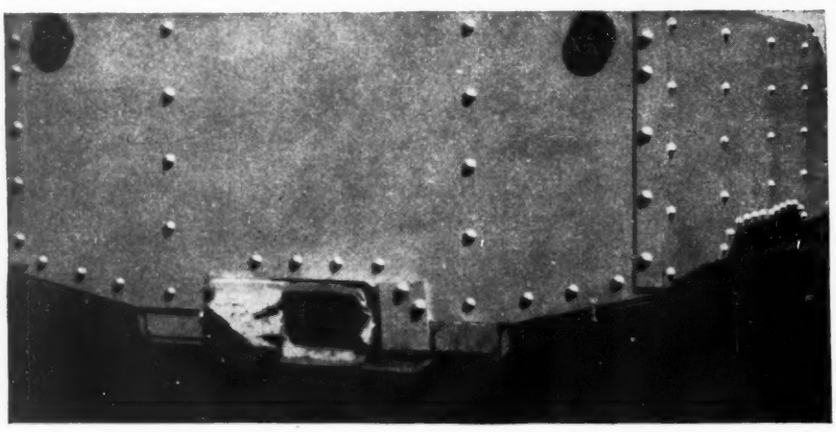
low maintenance





INDUSTRIAL CARS

Strong all-welded, all-steel construction combine body and frame. Outswinging side doors are held by sturdy semi-steel hinges. Heavy spring-type link and pin couplers. Equipped with Oilspok wheels with Timken roller bearings in hub. One lubrication, and no attention or adjustment required over several years.



ORE CARS

These cars are developed for work in narrow long tunnels and are equipped with special dump wheel mechanism. Strong, reinforced construction for handling heavy ore—partly welded, partly riveted body of heavy steel plate with extra strengthened bottom. Hinges and door mechanism oversized for heavy duty. Oilspok running gear with Timken roller bearings in hubs. Good for several years operation on one lubrication.

MINE CARS

These mine cars have long been favored for durability and low upkeep. Sturdy riveted and welded steel construction, automatic couplers. Solid ends for rotary dumping, and wheel brakes with wood blocks, rear operated. Body belts inside of vertical sides provide maximum capacity.

Write for further details on mine, ore or industrial cars.

HOCKENSMITH

WHEEL and MINE CAR CO.

Mine, Dump and Industrial Cars

PENN, PA. (Pittsburgh District) Phone Jeannette 700

Also manufacturer of Oilspok Wheels, Penn Dump Bodies and Hoists Since 1878

HARD ON THE WORK . . .
EASY ON THE WORKER



TWO-FISTED STRENGTH WITH FINE TOOL *Precision Balance...*

BIG FIST

ALLOY GRADE

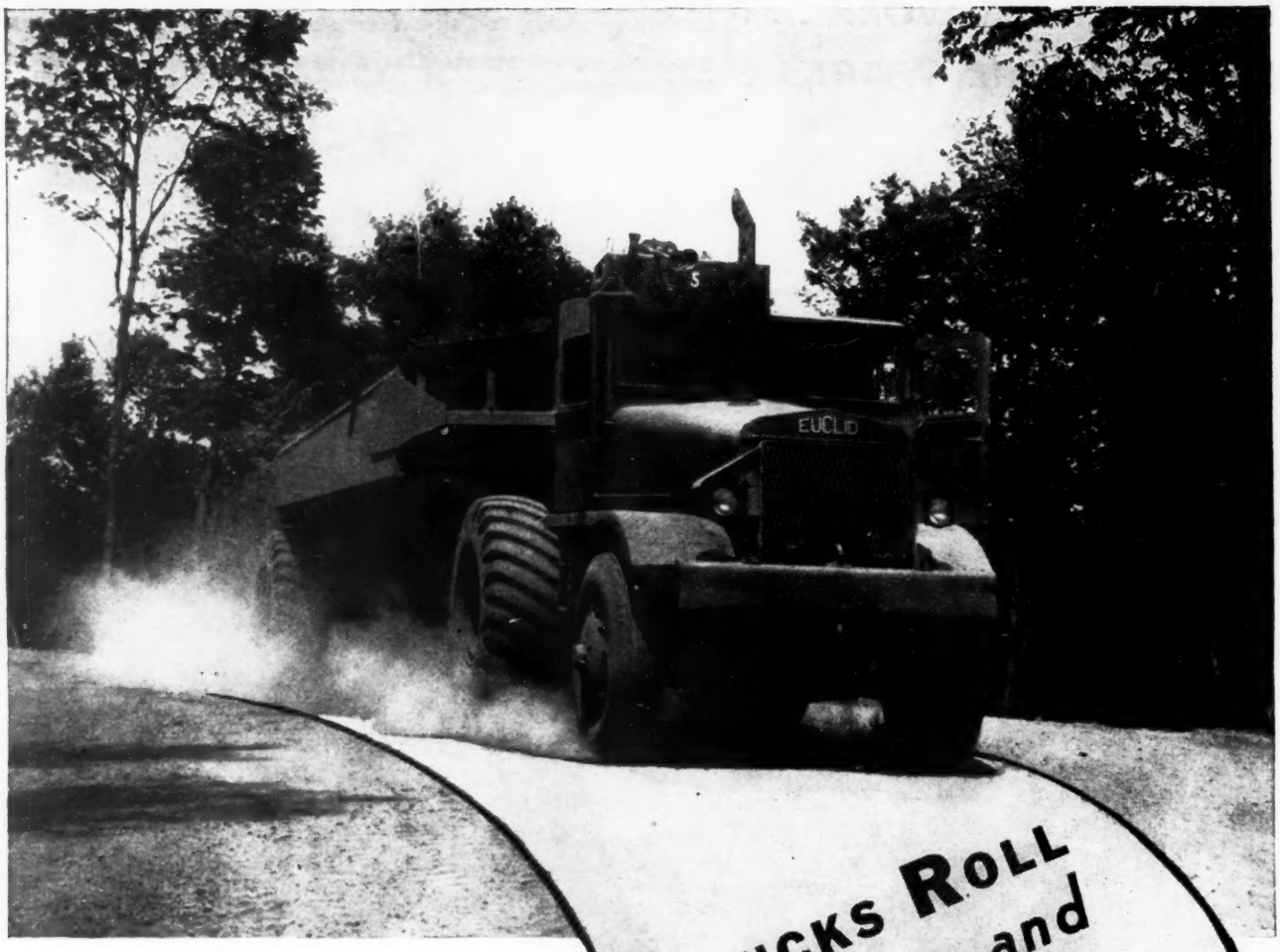
COAL SHOVELS

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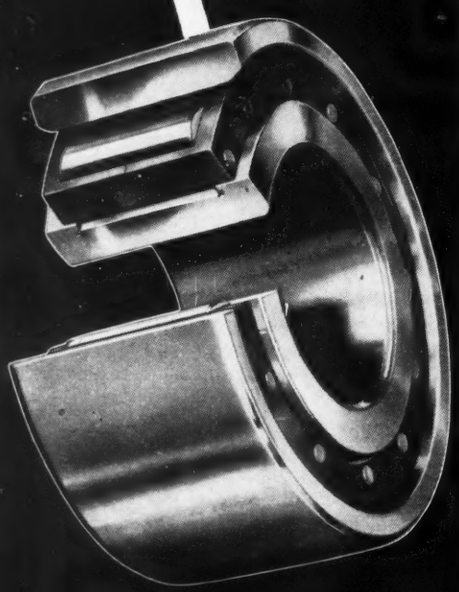
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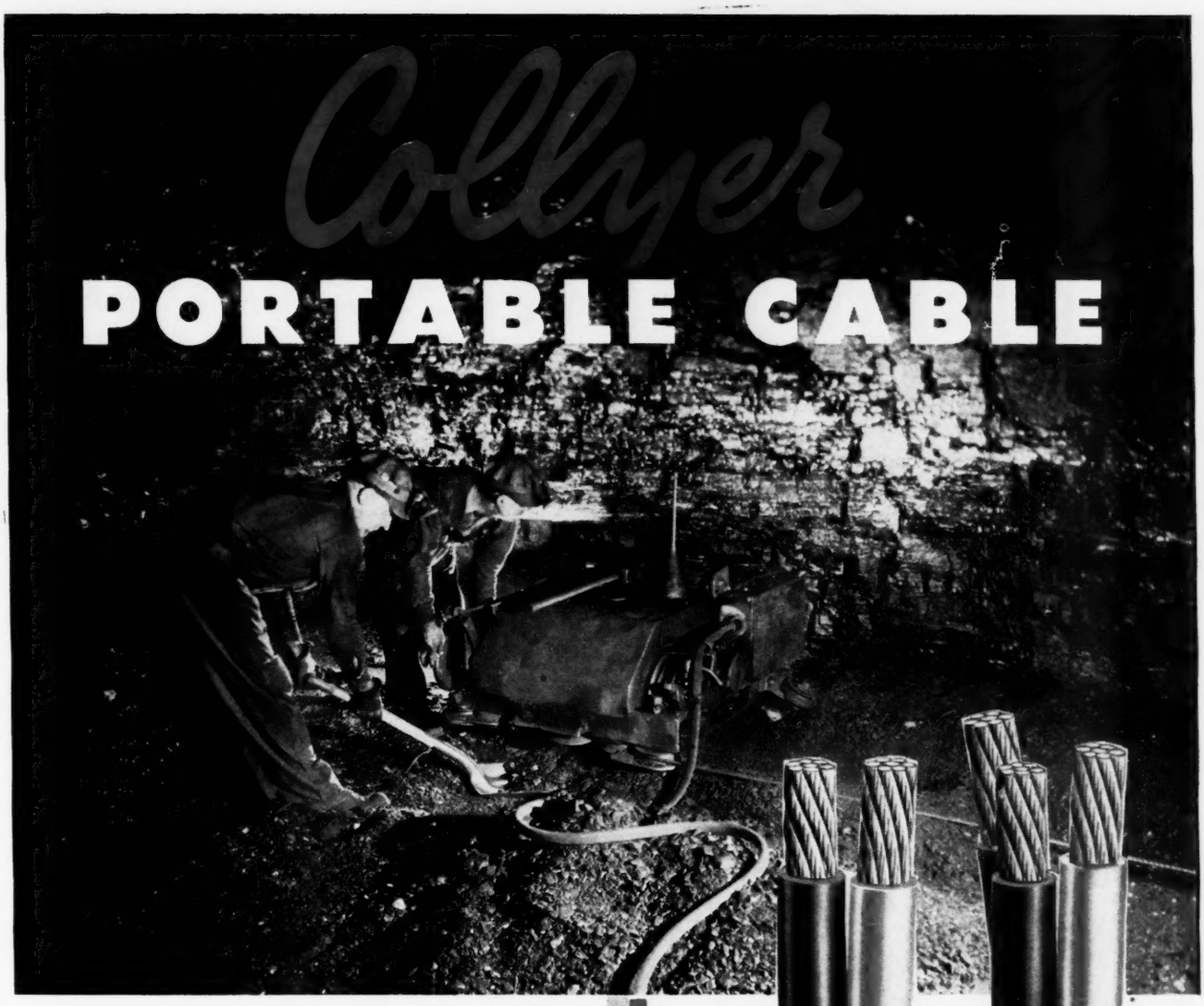
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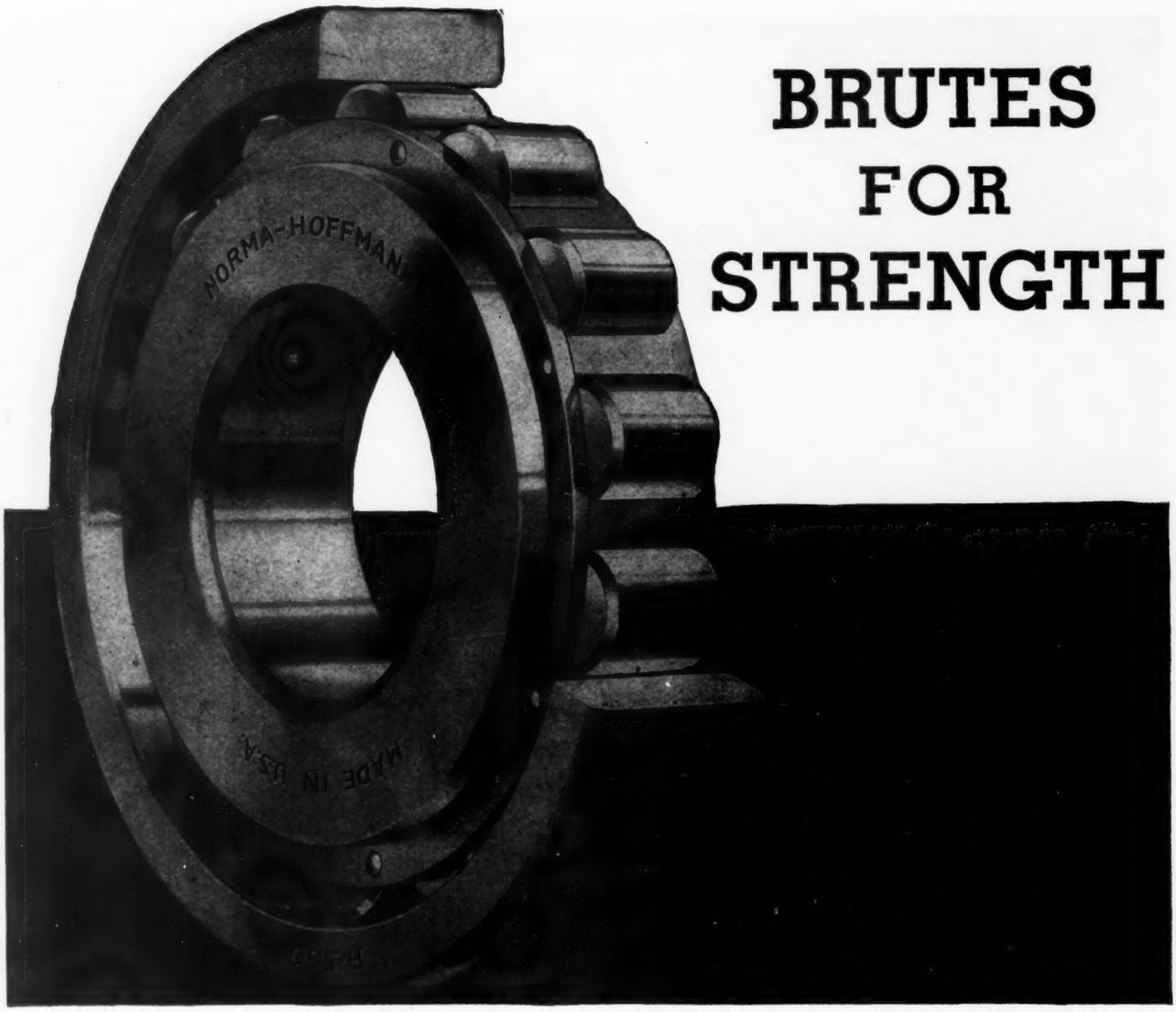
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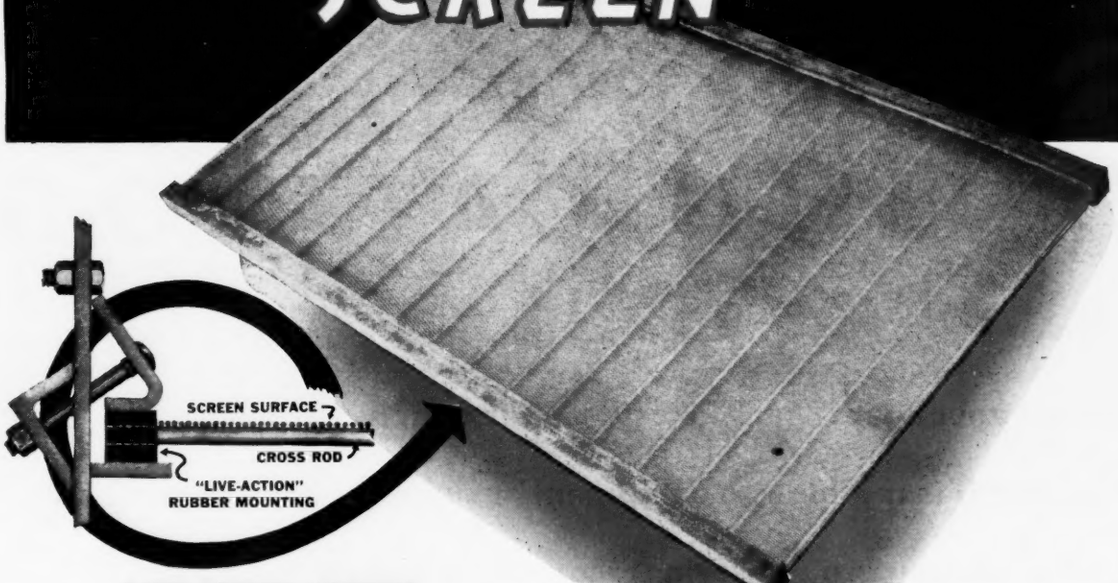
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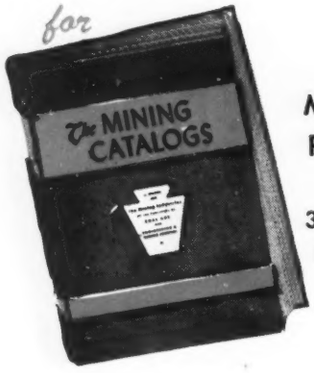
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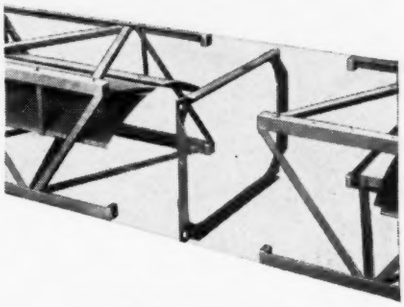
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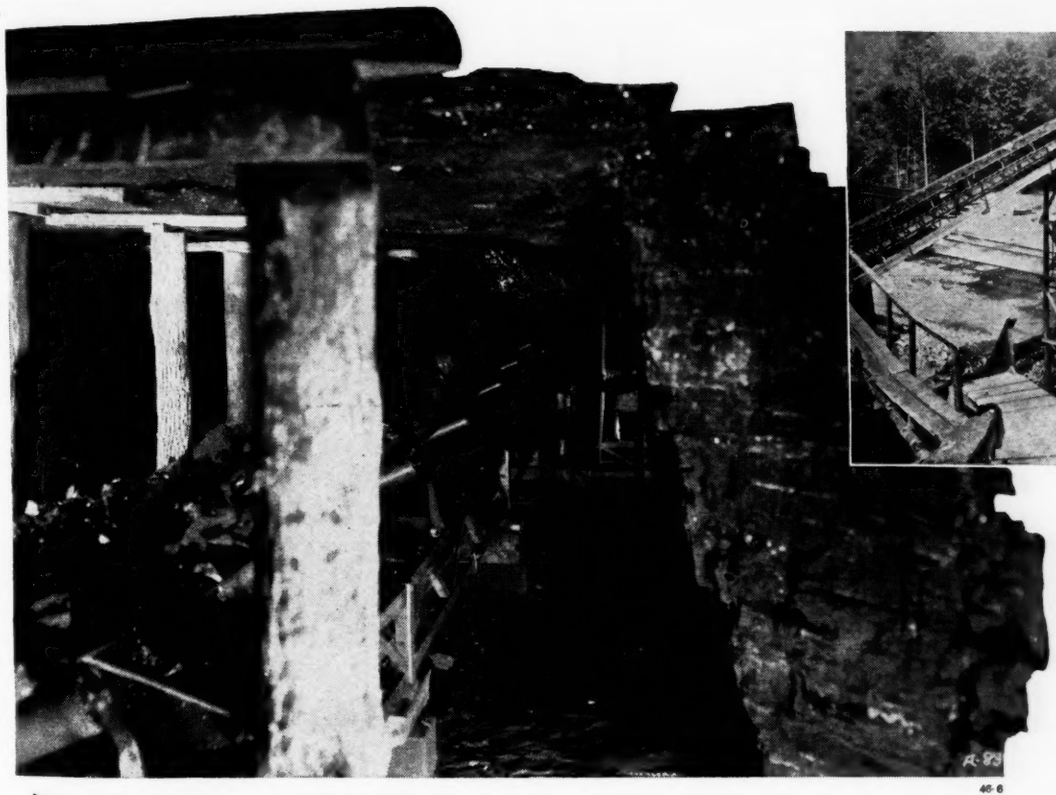
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Note the sturdy construction of the B-G Truss Frame. Requires fewer A-frames or supports than ordinary conveyors.





46-6

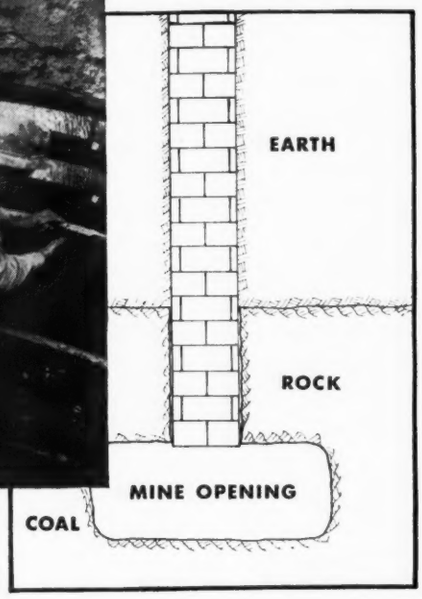
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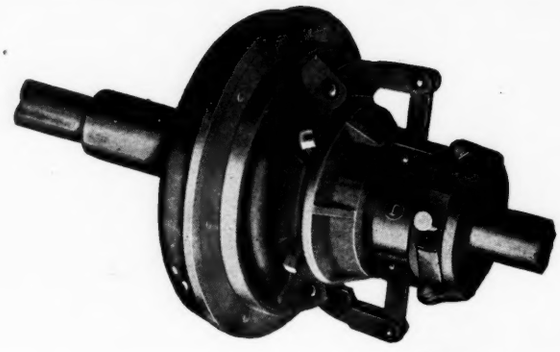
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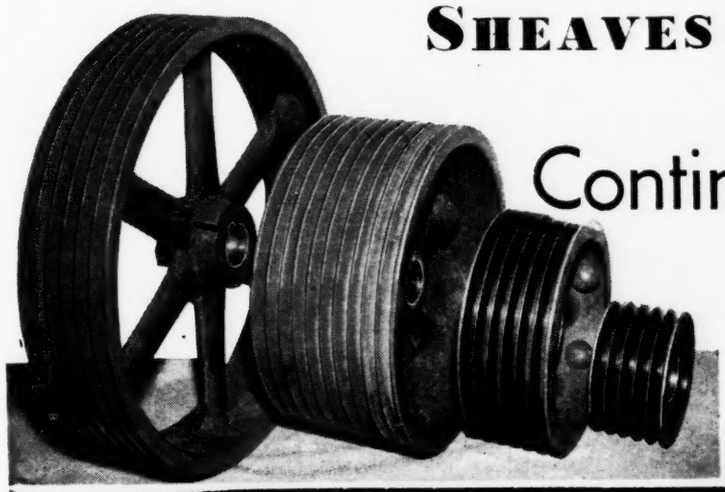
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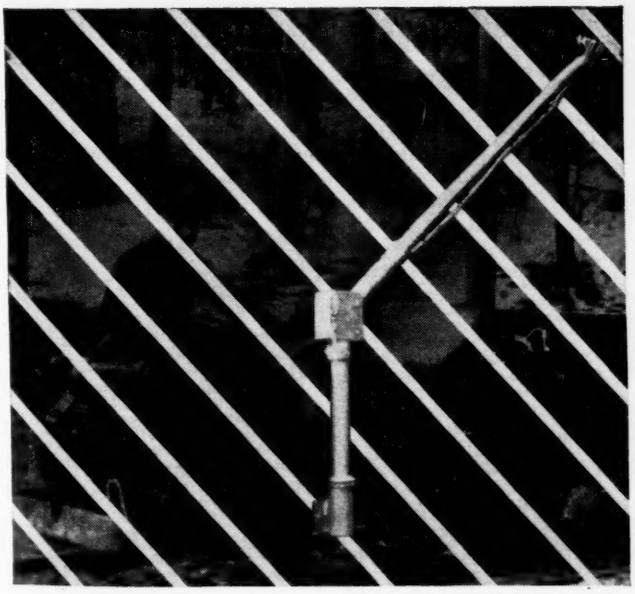
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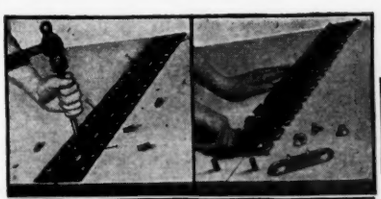
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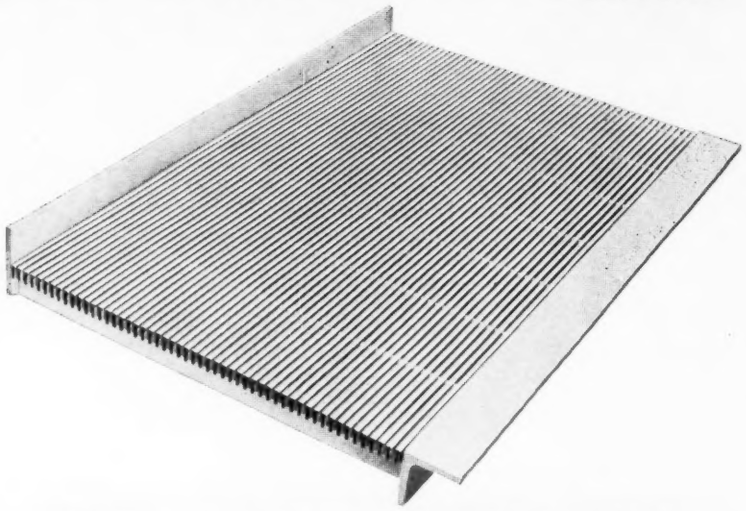
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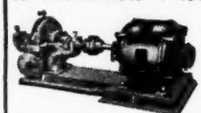


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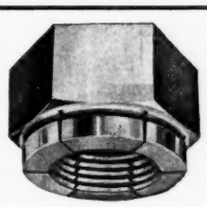
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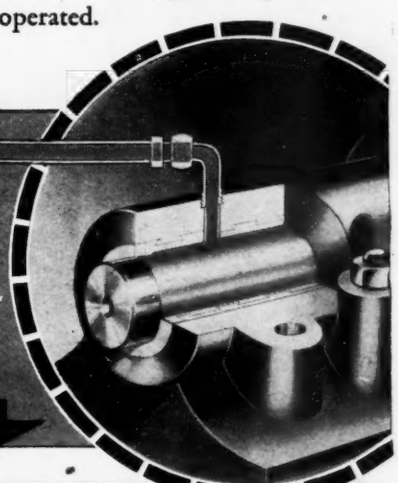
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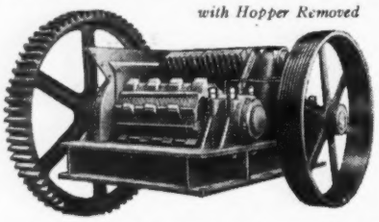
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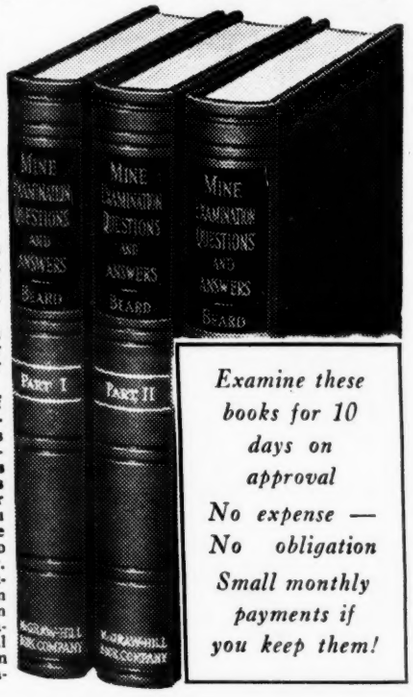
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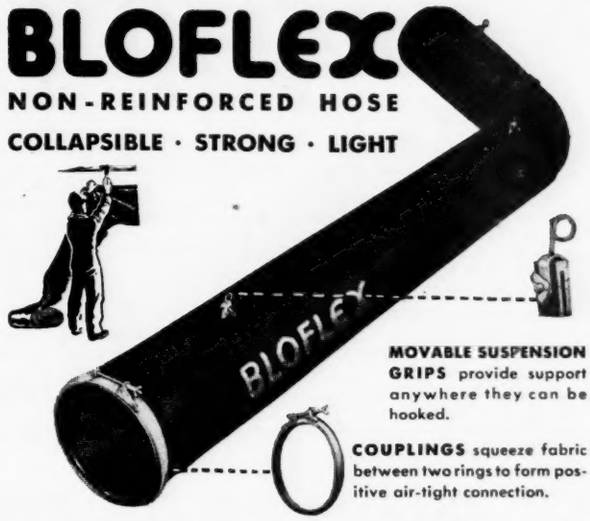
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30"	6	1/8"	1/16"
30"	5	1/8"	1/16"
24"	5	1/8"	1/32"
24"	4	1/8"	1/32"
20"	5	1/8"	1/32"
20"	4	1/8"	1/32"
18"	4	1/8"	1/32"
16"	4	1/8"	1/32"
14"	4	1/16"	1/32"
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16"	6	10"	5	5"	5
14"	6	8"	6	4"	5
12"	6	8"	5	4"	4
12"	5	6"	6	3"	4

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¾"	25 "	6.25	2.50 "
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100	West.	1200	440/220

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150 KW Ridgway 275 v. 900 RPM dir. con. 225 HP Ridgway Syn. Motor 2300 v. complete.
150 KW 250 v. Cr. Wh. 600 RPM dir. con. 200 KVA 440/220/3/60 West. Syn. Motor.
125 KW G.E. 250/275 v. 900 RPM dir. con.
190 HP G.E. I K sq. cg. 220/440 v.
100 KW Ridgway, 250/275 v.—150 HP Ridg. Syn. 220/440 v. 1200 RPM with AC & DC Panels.
75 KW 250 v. Westgh. 1200 RPM Gen. dir. con. 100 HP West. Syn. Motor 440/220/3/60 1200 RPM.
60 KW Westgh. SK Welding Gen. 1000 amp. 60 v. dir. con. 100 HP West. Syn. Motor 220/440.
15 KW West. SK 125 v. 1150 RPM Gen. dir. con. 25 HP Cr. Wh. 2200/440/3/60.

ENGINE GENERATOR & TURBINE SETS

65 HP Primm Oil Engine belted to AC or DC Gen.
57.5 KVA Allis Chalmers Gen. 220/3/60—Kerr Tur.
50 KW West. 125 v. DC—Skinner Engine.
50 KW 125 v. DC West. Turbo Gen.

TRANSFORMERS

Qu.	KVA	Prl. V.	Sec. V.
31	7½	2200	220/440
2	25	2200	110/220
1	37½	2200	110/220
3	50	22000	2200
3	50	2200	110/220

HOISTS

100—HP Lidgerwood sgl. fr. drum geared to 100 HP G.E. slip ring 220/440 v. 3 ph. 60 cy. MTC. Rev. drum & resistance.
40 HP Lidgerwood sgl. fr. drum geared to 40 HP G.E. slip ring 220/440 v. 3 ph. 60 cy. MTC. Rev. drum & resistance.
30 HP Carlin double dr. fr. 13" x 18"—5½" figs.
10 HP Hoist sgl. fr. dr. 22" Face 12" dia. 7" figs. dir. con. 10 HP AC Motor.
The above Hoists can be equipped with AC or DC Motors.

COAL CRUSHERS

18 x 24 and 18 x 30 New Scottdale dbl. roll.

SLIP RING & SQ. CG. MOTORS

HP	Make	Speed	WDG	Type
300	West.	1750	S.R.	CW
200	G.E.	600	S.R.	IM
150	G.E.	435	S.R.	IM
125	West.	700	S.C.	CS
100	West.	1750	S.R.	CW
100	G.E.	500	S.R.	M1-25 cy.
75 (2)	West. Vert.	1750	S.C.	CS 405
50	West. Vert.	1750	S.C.	CS
40	G.E.	900	S.R.	MTC
25	West.	575	S.R.	CW
20	West.	1200	S.C.	CS
15 (7)	G.E. (new)	900	S.C.	K

Other sizes down to 1 HP

DC Motors and Generators 230/250 V.

HP	Make	Speed	WDG	Type
175	G.E.	475	ser.	MD 109
150KW	Cr. Wh.	550	cp.	
130	G.E.	550	ser.	CO 1812
100	G.E.	480	ser.	MD 108
100	West.	625	cp.	S
75KW	West.	1000	cp.	S
60	Cr. Wh.	800	cp.	
55	West.	950	cp.	S
50KW	Cr. Wh.	1050	cp.	
50	Reliance	1500		185T
40	Roth	1500		(New)
25 (2)	West.	875	ser.	K 5
20	West.	750		SK
15	Cr. Wh.	800	sh.	CM
15	West.	560	cp.	S
7½	G.E.	825		CVC
7½	New West. Vert.	1750	sh.	SK 284
3	New G.E.	1150	cp.	B 254

PUMPS

4" suc. 4" dis. Lee Courtney Cent.—dir. con. 40 HP AC or DC Motor.
100 GPM 300' Head F. M. 2 stage, with 15 HP F.M. Motor 220/440 v. Motor.

AIR COMPRESSORS

561 cu. ft. 100# pres. Chg. Pneu. Type OCB 2 stage. Belted.

MOORHEAD-REITMEYER CO., INC. Pittsburgh 19, Pennsylvania

Serving the Coal Industry for more than a Quarter of Century

ROTARY CONVERTERS

500 KW AL-CH SYN 275 V. 6 Ph., 60 Cy., 1200 RPM, Pedestal Type, 2300/4000 V. Transformers.
300 KW G.E. SYN. 575 V., HCC, 6 Ph., 60 Cy., 1200 RPM, form P, 2300/4000 V. Transformers.
150 KW WEST. SYN. 275 V., 6 Ph., 60 Cy., 1200 RPM, Bracket Type, 2300/4000 V. Transformers.

MOTOR GENERATORS

300 KW G.E., SYN. 600 V., 2300/4000 V., 3 Ph., 60 Cy., 1200 RPM, Semi-Automatic Switchgear.
300 KW WEST. SYN., 275 V., 2200/4000/6600 V., 3 Ph., 60 Cy., 900 RPM, Manual Switchgear.
150 KW WEST. SYN., 600 V., 2300/4000 V., 3 Ph., 60 Cy., 1200 RPM, Manual Switchgear.

LOCOMOTIVES

13-T WESTGHSE., 250 V., 908-C Mts., 36"-44" Ga.
13-T WESTGHSE., 500 V., 908-C Mts., 36"-44" Ga.
13-T GOODMAN, 500 V., 36-B Mts., 36"-42" Ga.
10-T WESTGHSE., 500 V., 907-C Mts., 36"-44" Ga.
10-T WESTGHSE., 250 V., 907-C Mts., 36"-44" Ga.
8-T WESTGHSE., 250 V., 906-C Mts., 36"-44" Ga.
8-T GEN. ELEC., 250 V., 839 Mts., 36"-48" Ga.

Each unit listed above is owned by us and is available now for immediate purchase.

WALLACE E. KIRK COMPANY
INCORPORATED
501 Grant Building Pittsburgh, Pa.

FLORENCE MACHINERY & SUPPLY CO.
COAL MINE EQUIPMENT & SUPPLIES

COAL CUTTERS

1—29-LE Jeffrey Coal Cutter, 250 Volts DC, mounted on Joy Cats
7—CE-7 Sullivan, 220 or 440 Volts AC
1—Goodman Universal, 250 Volts DC
1—Goodman Standard, 250 Volts DC

LOADERS

1—Manierre Box Car Lump Loader
1—Manierre Type Box Car Egg Loader
1—Joy Elevating Ramp, 250 Volts DC
1—7-BU Joy Loader, 250 Volts DC

PIT CARS

140—1 Ton R.B. Card, 36" Ga.
119—1 Ton P.B. Card, 36" Ga.

GENERATORS

1—25 KW Crocker-Wheeler, 250 Volts DC, with Board
1—100 KW G.E. 550 Volts DC, with Board
1—100 KW Hertner, 250 Volts DC, direct con. to 150 H.P., 440 Volts Syn. Motor, with Switchboard

TRANSFORMERS

3—200 KVA Allis-Chalmers, 13200-240/480
3—100 KVA West. 13800-460/230/115
3—75 KVA G.E., 13200-2300/4000Y (New)
3—50 KVA G.E., 13200-12000-230/460
3—50 KVA G.E., 13200/2300
1—10 KVA Gregory, 440-110/220
1—7½ KVA G.E., 1150-2300-115/230
1—5 KVA West., 440-110/220
1—3 KVA G.E., 550-110/220

SHAKER SCREENS

1—Single Deck, 4' x 13'6"
1—Double Deck, 4' x 27'
1—Double Deck, 8' x 40'

MISCELLANEOUS

3—100 H.P. HRT Boilers
2—Van Dorn Coal Drills
1—Jeffrey Coal Drill
35—Tons—40# Rail
10—Tons—85 Rail
Plate Frogs & Switches, 16# to 40#
175—Union Sanitary Basket Type Drying Hangers

We have a complete stock of practically everything.

Write for Complete Stock List No. 8

904 EQUITABLE BLDG. DENVER 2, COLORADO

Yards: Denver & Florence

WESTINGHOUSE
TYPE SK—MOTORS
America's Best Stock
WIRE INQUIRIES COLLECT



MOTORS, GENERATORS, TRANSFORMERS *BOUGHT & SOLD*
For prompt action, wire specifications collect
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BONDED SCALES
VIBRATING SCREENS
CRUSHERS

20 ton, 24' x 10' Truck Scale	$575.00
20 ton, 34' x 10' Truck Scale	815.00
5 ton tipple scale	175.00
3' x 6' Single Deck Screen	495.00
3' x 8' Double Deck Screen	685.00
Double-Roll Coal Crusher	345.00
Portable Coal Conveyor	745.00

Immediate Shipment—Terms

BONDED SCALE COMPANY, MFRS.
2190 S. Third St., Columbus 7, Ohio
Phone Garfield 1651—Eve. University 2832

AIR COMPRESSORS:
12—Belted 360, 676, 870, 1000, 1300 ft.
12—Diesel 105, 315, 520, 676 & 1000 ft.
6—Electric 1300, 1500, 2200, 5000 ft.

RUBBER CONVEYOR BELTS:
1000', 60". 600', 30". 300', 20". 1000', 42". 900', 48". 1450', 36". 1200', 24". 900', 18". 600', 16". 350', 14".

ELECTRIC LOCOMOTIVES
15—3, 5, 8 ton Battery & Trolley.

DIESEL GENERATORS:
12—100, 150, 180 & 480 KW.

MINE LOADERS:
17—GD9, Eimco 21, Conway 20, 30, 60 & 75 and Sullivan HL3.

STEEL TANKS
30—8000, 10,000 & 20,000 gallon capacity.

SHOVELS—DRAGLINES:
7—1 yd., 1½ and 2 yd. Gas & Diesels.

R. C. STANHOPE, INC.
60 E. 42nd Street New York 17, N. Y.

SEARCHLIGHT SECTION

LOCOMOTIVES

Goodman: All 250 volts.
1—6 ton, 30B, 43" 1—5 ton.
1—5 ton, W-1-2, 36".
2—5 ton, 2600 K.
2—6 ton, 33-1-4-T.
2—8 ton, 32-1-4-T.

Westinghouse: All 250 volt.
1—4 ton, 902, 48".
4—904 c. 44" 500 volt and 250 volt. Also 906 motors and 102-904-115.
1—10 ton, 915, and 907.
Bar steel frames 10 ton, 6 ton, and 4 ton.

G.E.: All 250 volt. 4 ton 1022, 44", as is
6 ton 803, 44" as is 5 ton 825, 44" & 36"—
6 ton 823, 44" 8 ton 839 motors
6 ton 801
8 ton 839
Battery Locomotives G.E., Ironton, Atlas. Whitcomb and 1½ ton Mercury.

Jeffrey: 6 ton and 4 ton, all gauges, 250 volt. 8 ton, 250 and 500 volts, 10 ton. MH78—13 ton MH110, 500 volts.

MINING MACHINES

Jeffrey: 35B and 4—28A, 250 V. 4—29B, 29C, 29CE with shearing head. Also I on cats. Revolving head for 29C.
35BB **Jeffrey** mining machine.
1—35 BB AC 220 volt.

Goodman, 12A, 12AB, 12AA, 12G3A, 24B.
1—12 13 220 volt and 2—112 DA. 500 volt.
2—Permissible Type 12CA. 6—112AA.
2—124 E.J.
Motors for 212AA, both 250 and 500 v.

Sullivan, CE7, CE9, CE10, CR10 Low Vein. CR5 for middle cutting.

SUBSTATIONS—275 volts, D. C.

2—150 KW **West.** Rotary.
1—200 KW 1—100 KW **Ridgway** M-G Sets.
2—100 KW **G.E.** Rotary.
1—200 K **Westinghouse** M-G Set 900 RPM, 2300-270 volt.
1—100 KW **Westinghouse** M-G Set.

SPARE ARMATURES

Jeffrey MH 110, MH 78, MH 73, 29B, 35B and 28A. **Goodman** 34B, 30B, 30C, 12A, 2600 K and R, 12AB, 12AA, 33-I-4-T, 31-I-4-T, 32-I-4-T. **General Electric** 801, 803, 807, 819, 821, 825, 839. **Westinghouse** 904, 905, 906, 102, 907, YR2, 115. Also 200 KW **Westinghouse Rotary Converted Armature,** 250 V Bracket Type, 150 KW G. E., HCC Bracket Type, and 150 KW G. E., TC Pedestal Type. **Sullivan** CE6, CE7, CE9 and CE10.

AERIAL TRAMWAYS • HOISTS • PUMPS • MOTORS • TRANSFORMERS • BOND WELDERS • RESISTANCE • COMPRESSORS • DUMPS • SPEED REDUCERS FIELD FRAMES • ARMATURES • GOODMAN HYDRAULIC SHOVELS • MOTOR STARTERS AND CONTROLLERS—AC & DC • DROP BAR SUPPORTS (Gooseneck), 29B and 29C • MINING MACHINE TRUCKS • SWITCHBOARDS • CIRCUIT BREAKERS—AC & DC • COAL CRUSHERS (double roll) 12"x16", (single roll) 24"x36", 24"x24" • LATHES, SWITCHES • AUTOMATIC CIRCUIT BREAKERS 250 volt 600 amps to 2000 amps • MANUAL CIRCUIT BREAKERS 600 amps to 3000 amps • HOISTS, overhead, AC 3-60-440, 1 ton and 2 ton • 1 clam shell bucket 1¾ cubic yard • MINE CARS • 2 SULLIVAN BIT SHARPENERS • R. R. SWITCHES 85# to 100# GENERATORS DC 250-275 volt, 30 KW to 100 KW. Also SPARE MOTORS DC and AC for mining machines and locomotives. BELT CONVEYORS, SLATE, LARRY. 2—14BU Joy Loaders, 250 v. on Cats. 2—5BU on Cats. 1—8BU on Cats. 2—Myers-Whaley, #3 and #4 Automatic and other loaders. DIESEL POWER PLANTS, 50 KW to 250 KW

GUYAN MACHINERY COMPANY, Logan, W. Va.

LOCOMOTIVES

1—4 ton Jeffrey, type MH-96, 250 volt, 44" gage, with cable reel
1—5 ton Goodman, 250 volt, type 2600-R, 42" to 48" gage, with reel
1—6 ton Goodman, 250 volt, type 30-C, 42" or 44" gage, with reel
1—10 ton Jeffrey, 250 volt, type 66, 44" gage. Spare armatures for 30-C, 30-B, and 32-0-4-T locomotives, and 1-MH-96, and 2-MH-78 Jeffrey's

CUTTING MACHINES

1—29-C Jeffrey Arcwall, 250 volt, any gage
1—29-B Jeffrey Arcwall, 250 volt, any gage
1—28-A Jeffrey Shortwall, 250 volt, any gage
2—112-AA Goodman Universals, 250 volt, with or without trucks
1—CR-2 Sullivan Shortwall, 250 volt, low vein
1—CE-7 Sullivan Shortwall, 250 volt
2—35-L Jeffrey Shortwalls, 220/440 volt, AC
3—Sullivan 7-AU cutting machines

SUBSTATIONS

1—80 KW Westinghouse MG set complete, 250 volt DC, 2300 volt AC

1—200 KW GE Rotary Converter, 275 volt DC

MISCELLANEOUS

7—Goodman, type 85-A Pit car loaders, 250 volt

3—Jeffrey, type 58-C Pit car loaders, 250 volt

44—Low vein mine cars, 44" track gage

10—300 and 400 ampere welding machines, GE, Hobart, and Lincoln

Many other items in stock—Used and rebuilt

We solicit your inquiries

ALL-STATE EQUIPMENT CO.
LOGAN, W. VA. *Phone 884*

MINE HOISTS

1—Thomas 24" dia. Drum with 50 H.P. Motor & Control
1—Ottumwa 36" dia. Drum with 75 H.P. Motor and Control.
1—Wellman, Keyed Drum, 60" Dia. will coil 4500 ft. 1" rope, 200 or 300 H. P. Motor with Magnetic Control.
1—Vulcan, Shaft Hoist, 72" Dia. Suitable 300 ft. Shaft. Motor with control to suit requirements.
1—Nordberg, Shaft Hoist. 72" Dia. Suitable 200 ft. Shaft. 150 H.P. Motor with Control.
1—Vulcan, Cylindro-Conical, Shaft Hoist. Drum 7'-9' Dia. Suitable 350 ft. Shaft. 400 H.P. Motor with Control.

Other Hoists Available to suit all mining conditions.

JONES MINING EQUIPMENT CO.
Empire Building, Pittsburgh 22, Pa.

PIPE—MACHINERY—GAS ENGINES
AIR COMPRESSORS—DIESELS—PUMPS

Some Steam Engines and Boilers available only slightly above the metal price

BRADFORD SUPPLY COMPANY
WAYNE, WOOD COUNTY, OHIO **Near Toledo**

FOR SALE—
SHASTA DAM SAND AND GRAVEL PLANT EQUIPMENT

Including—
GOODYEAR 9-MILE-HAUL 36" SPECIAL CONVEYOR BELTING
16,000' of Belt Remaining With Idlers, Pulleys, and Drives
ALSO—
Electric Motors, Line Equipment, Transformers, and Supplies
Pendulum Boom Belt Conveyors, 100' and 200'
Merrick Feedoweights and Weightometers
Dorr Hydroseparator, 20' x 4'
Marcy Rod Mill, 8' x 12'
Vibrating Screens
Dorr Rake and Bowl Classifiers
Extra-heavy Gravel Washer, Trommel type
Pumps: Centrifugal, Deep-well, Steam, Dredge
Auxiliary Equipment: Chain Hoists, Winches, Welding Machines, etc.

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Columbia Construction Company, Inc.
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PIPE New & Reconditioned

ALL SIZES for ALL PURPOSES
Cut and Threaded to Your Specifications
VALVES AND FITTINGS
UNITED PIPE & SUPPLY CO. Department 110 NORRISTOWN, PA.

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New and Used

Large stocks, all sizes
attractive prices

L. B. FOSTER COMPANY
P. O. Box 1647 Pittsburgh 30, Pa.

5—Jeffrey 35-A Shortwall machines, 250 volts D.C.
1—Jeffrey 36-B Longwall machine, 250 volts D.C.
1—Flory hoist, 100 H.P., 440 volts, 3 phase, 60 cycles.
5—Battery locomotives, 36" Gauge.
3—Jeffrey 35-L Shortwall low vein machines, 220/440 volts A.C.

BERRETTINI ELECTRIC CO.
378 N. MAIN STREET, PLAINS, PA.

Electrical Equipment

Converters, Motor Generator Sets, A. C. & D. C. Motors, Control Equipment and Transformers.
We build equipment to fit your requirements. Over 25 years engineering background.

C. B. LOCKE CO.
P. O. BOX 3227
TEL. 38-136
CHARLESTON W. VA.

NEW and REBUILT

FOR SALE

100 KW GE 250v DC Generator

Complete with Switchboard.

Jeffrey Pit Car Loader

36" or 42" Gage Just rebuilt A1 Condition.

MID-CONTINENT COAL AND COKE CO.
Sturgis, Kentucky

REBUILT EQUIPMENT—READY TO SHIP

MOTOR GENERATOR SETS

1—100 KW 720 rpm. 250 v. West. Gen. dir. con. 2200 v. 3 ph. 60 cy. motor.
2—75 KW 250 v. West. Gens. dir. con. 440 v. 3 ph. 60 cy. AC Motors.
1—75 KW 850 rpm. 250/275 v. DC type SK West. Gen. dir. con. to 100 HP 850 rpm. 220 or 440 v. 3 ph. 60 cy. West. CCL Motor.
1—75 KW 850 rpm. 250/275 v. DC type DLC General Electric Gen. dir. con. to 100 HP 850 rpm. 220 or 440 v. 3 ph. 60 cy. West. CCL Motor.
2—65 KW 1800 rpm. 250 v. G.E. Gens. dir. con. 220/440 v. 3 ph. 60 cy. AC Motors.
1—50 KW 250 v. DC Gen. dir. con. 220/440 v. 3 ph. 60 cy. AC Motor.
1—40 KW West. 250 v. DC Gen. dir. con. 220/440 v. 3 ph. 60 cy. AC Motor.
1—30 KW 250 v. DC cp.wd. Gen. dir. con. 220/440 v. 3 ph. 60 cy. AC Motor.
2—25 KW 250 v. DC West. Gens. dir. con. 220/440 v. 3 ph. 60 cy. Motors.

MINE LOCOMOTIVES

1— 5 ton Ironton Storage Battery Locomotive.
1—13 ton Westinghouse 42" ga. 250 v. Locomotive, two motor type; single end control.

PUMPS

1—Amer. Piston Pump—5½x4½"—size 8x12.
1—48 GPM 161' hd. Roper 3" suc. 3" dis.
1—90 GPM 225 ft. head, 600 rpm. 2x2" Blackmer.
1—220 GPM 225 ft. head, 600 rpm. 3½"x3" Blackmer.
1—30 GPM Amer. Steam Pump Co. 150' hd. 5½" intake x 4½" discharge, 45 rpm.
2—500 GPM Morris Machine Wks. 4" suc. 4" dis. 123' hd. 1760 rpm.
1—500 GPM Ingersoll Rand "Cameron" 4" suc. 3" dis. 1750 rpm.
1—2000 GPM De Laval 170' head.
1—3000 GPM De Laval 144' hd. 150 HP.

SLIPRING MOTORS—3 ph. 60 cy.

HP	Make	Type	Volts	RPM
700	G.E.	MT-432	2200	393
260	Burke	EMV-65	440	600
75	G.E.	I	220/440	1200
60	West.	CW	220	1800
50	West.	HF	220/440	1120
50	Chand.		220/440	1800
15	G.E.	I-8	440	845
10	G.E.	MTC-5201	220	1200
7½	G.E.	MTC-5201	220	1200
1½	Wagner	RS1	220	1160

230 V. DC MOTORS

HP	Make	RPM	Type
100	West.	300/700	SK
85	West.	500	M
80	West.	490	76A
75	G.E.	600	MP
75	West.	800	M
25	Hawthorn	475	HL
25	Reliance	850	
25	Westg.	600	SK
20	West.	975	S
20	West.	1750	SK
15	Al. Ch.	800	
13	Cr. Wh.	1100	CM
10	Cr. Wh.	675	CCM
10	Cr. Wh.	825	CM
5	Westg.	850	
5	Cr. Wh.	980	CM

TRANSFORMERS

No.	Kva.	Pri.	Sec.	Make
9	5	2200	110/220	G.E.&West.
85	7½	2200	110/220	G.E.&West.
16	10	2200	110/220	G.E.&West.
21	15	2200/1100	440/220/110	West.
3	15	2200	110/220	Packard
3	15	2200	110/220	Cr. Wh.
2	20	1150/2300	115/230	Maloney
1	20	2300	110/230	West.
2	20	2200/1100	440/220/110	West.
2	25	2300	110/220	West.
6	37½	2400	240/480	G.E.
3	40	2200/1100	220/110	West.
1	40	1100/220	110/220	Pittsburgh
1	40	2300/1150	115/230	Maloney
2	50	2200	110/220	Packard
1	50	6600	550/440	Ilis Chal.
1	50	2200/1100	220/110	West.
2	50	2200/1100	220/110	Maloney
1	75	2400	240/480	G.E.
1	75	2400/4160Y	120/240	West.
3	100	2400	480	Allis Chal.
3	125	2200	220/440	G.E.
2	150	2200/2300/2400	220/230/2	G.E.
3	250	6600/5940	2300	West.

DIESEL ENGINE GENERATOR SET

1—50 kw. 250 v. DC Gen. dir. conn. to 65 HP Primm Diesel Hor. Engine.

COMPRESSORS

2—315 CFM Ingersoll Rand portable 100# pres. driven by 105 HP Waukesha Oil Engines, 860 rpm.

DUQUESNE ELECTRIC & MFG. CO., PITTSBURGH (6), PA.

MINING MACHINES

AC To DC

REBUILT & GUARANTEED FOR IMMEDIATE SHIPMENT

COAL CRUSHERS
Single & Double Roll
Electric Coal Drills, Mine Fans, Tipple Scales, etc.
Ironton 5-ton Storage Battery Locomotives 36" or 42" Gauge, with or without batteries
CONVEYORS—Belt and Drag
Equipment of all kinds
Buy, Sell or Exchange

THE INDUSTRIAL EQUIPMENT CORP.
705 First National Bank Bldg.
Pittsburgh 22, Pa.
Warehouse: Carnegie, Pa.

CRANE AND HOIST MOTORS AVAILABLE

All 3 Phase, 60 Cycle, 220/440 Volts.

1—75 H.P.	Westinghouse	CI 658-D	690 RPM
1—35 H.P.	G.E.	ITC 5012	1150 RPM
1—30 H.P.	G.E.	ITC 5010	1145 RPM
1—75 H.P.	G.E.	ITC	850 RPM
1—30 H.P.	WE&M	CI	690 RPM
1—15 H.P.	WE&M	CI	690 RPM
1—15 H.P.	WE&M	CI	850 RPM
1—40 H.P.	G.E.	MQC 5322	1200 RPM 2 ph.
1—20 H.P.	G.E.	MTC 312	1150 RPM
2—50 H.P.	WE&M	658-A	575 RPM
2—52 H.P.	G.E.	ITC 5013	575 RPM
1—35 H.P.	WE&M	CI	690 RPM
1—15 H.P.	Ideal	A-80-15	1200 RPM
1—50 H.P.	G.E.	MTC	600 RPM

230 Volts D.C. Motors

1—7½ H.P.	WE&M	SK	1150 CP Sealed Sleeve
2—7½ H.P.	WE&M	SK	850 SH Sealed Sleeve
8—15 H.P.	WE&M	SK	1750 SH ball bearing
7—20 H.P.	WE&M	SK	1750 SH ball bearing
4—25 H.P.	WE&M	SK	1750 SH ball bearing
1—25 H.P.	WE&M	SK	1750 SH ball bearing
1—30 H.P.	WE&M	SK	1750 SH ball bearing

Large stock of other New and Used Squirrel Cage, Slip ring, Transformers, Pumps, Hoists, etc.
Your inquiries solicited.

PENN ELECTRICAL ENGINEERING COMPANY
517-521 Ash Street, Scranton 9, Pa. 'Phones 8175-6-7-8

For Immediate Shipment

215 all steel mine cars—80 new, remainder slightly used, end dump (may be easily changed to tight end for rotary dumping), 14" Timken bearing wheels, 42" gauge, 40" wheel base, 6'6" overall width, 11'6" overall length, 34" high above rail—loading end dropped to 28", capacity 124 cubic feet level full, equipped with semi-automatic spring couplers.
100 sets steel side boards to increase capacity of cars to four tons if desired.
One Phillips cross-over dump, 42" ga.—new.
One heavy duty trip feeder—specification upon request.
One "Nolan" automatic cager.
Three sheave wheels, 84" dia for 1⅜" rope.
Two Holmes self-dumping cages—used.
One Holmes self-dumping cage—new.
Two sets dumping brackets for cage—used.
683 lin. ft. 1⅜" dia. 6x19 blue center hoisting rope.

Templeton-Matthews Corp.
Sycamore Bldg. Terre Haute, Ind.
Crawford 7051

-TRANSFORMERS-



3— 833 KVA 13200—240/480 V.
2—1000 KVA 2300—460/2300 V. scott taps
3— 667 KVA 6900/12000Y—2300 V.
6— 333 KVA 13800—230/460 V.
9— 75 KVA 33000—2400 V.

One Year Guarantee

THE ELECTRIC SERVICE CO., INC.
"AMERICA'S USED TRANSFORMER CLEARING HOUSE"
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